Update - FDR/UPSTREAM v3.1.5

FDR/UPSTREAM Workstation/Server v3.1.5 is an update to v3.1.4c, a major release containing a number of new features and problem resolutions.

New features (since v3.1.4) include:

- Automatic UPSTREAM multi-processing for both host and locally initiated requests. Now Windows and UNIX versions of UPSTREAM will automatically handle as many host, Director or local requests as you wish to submit. This feature is on by default and requires no special client setup.
- Windows complete system backups. You can now backup all files on all read/write volumes on a given Windows system (including the Windows System State), with a single file spec. This dramatically simplifies backup specification.
- Windows 2000 system state. Now all the components of the Windows 2000 system state can be backed up in a single PlugIn and can be restored as a single entity. This includes boot and system files, the registry, COM+, SysVol, Active Directory, Certificate Server database and the Cluster database. Windows 2000 System State disaster recovery procedures are documented.
- Oracle agent improvements including multi-channel support for UNIX.
- UPSTREAM Director based FDRSOS Local Backup Disk Management. FDRSOS Local Backup Disks can now be managed in the UPSTREAM Director, providing a full featured GUI for Local Backup disks for all systems.
- Linux X86 FDRSOS Local Backup Support.
- Enhanced UPSTREAM Director features including Local Backup Admin and multiple UPSTREAM support.
- S/390 Linux. FDR/UPSTREAM now supports SuSE Linux and TurboLinux on S/390 hardware. See the Linux instructions in the current FDR/UPSTREAM manual for specifics on installation and use.
- Support for up to 255 character file names.
- (UNIX/Windows) Multi-processing UPSTREAM. UPSTREAM is now automatically capable of supporting multiple simultaneous executing instances of UPSTREAM in the same directory. Workpath, restarts and a number of other issues are automatically handled.
- (Notes R5) A number of Lotus Notes enhancements including support for multiple simultaneous backups and incremental support.
- (Novell SMS) Procedures for utilizing open file support in NetWare v5.1 with NSS volumes.

Remote Initiated Multi-Processing UPSTREAM (v3.1.4e)

UPSTREAM will automatically perform multi-processing for both host and locally initiated requests. Now Windows and UNIX versions of UPSTREAM will automatically handle as many host, Director or local requests as you wish to submit. This feature is on by default and requires no special client setup.

When you install or upgrade your UPSTREAM daemon or service, UPSTREAM will operate as usual waiting for remote requests. This copy of UPSTREAM will be the instance which will listen on the inbound IP port and will run until it is killed. However, if a remote request is received, a new copy of UPSTREAM will automatically be started to service this request. Each of these child copies will terminate when the given request has completed.

What this means is that you can submit as many jobs to UPSTREAM at any given time and gain the performance advantages of multi-processing without any effort on the client. For example, if you wish to backup the C:, D: and E: drives simultaneously to separate backup profiles, you can submit all three jobs at one time. In earlier versions of UPSTREAM you had to either sequence them so that only one ran at a time, run separate listening UPSTREAM processes, or (for Windows) run the multi-user version. The existing multi-user feature in Windows is still supported, but we recommend that new installations not use it as the new method is quite a bit simpler to manage.

Each copy of UPSTREAM will write to the same upstream.log file. When the parent UPSTREAM starts a child it will write the child's process ID number to the log. To determine messages for a given instance of UPSTREAM in the log, you will have to identify them by process ID number (logged with the message timestamp).

In Windows, if you are running US.EXE, a separate window will be created for each independent request. If you are running uscmd, UPSTREAM will write messages to only the parent (listening) process's screen.

When you upgrade your UPSTREAM to the new version, you will need to upgrade the Director as well. When the Director needs to have UPSTREAM process a request, it will start a given UPSTREAM which it will then manage.

This feature is on by default. To disable it and have the listening UPSTREAM process inbound requests, set the environment variable **USNOTATTMGR** to any value.

Windows 2000 System State (v3.1.4e)

Overview

Starting with version 3.1.4e of FDR/UPSTREAM/PC, UPSTREAM now has the capability of backing up and restoring the entire System State of a Windows 2000 computer. The System State is a concept new to Windows 2000 and consists of the core set of files and database data which must be backed up as a whole to ensure that a consistent snap-shot of the system is captured. The System State, as defined by Microsoft, consists of:

- Boot and system files. These are the files in the root of the boot drive (what Microsoft calls the system drive), all of the files in the new System Protected Files list and a few others.
- The registry.
- The COM+ Class registration database.
- The SysVol.
- The Active Directory database (for Domain Controllers only).
- The Certificate Server database (only if the computer is a Certificate Server).
- The Cluster database (only if the computer is a member node of a cluster).

To deal with all of these components as a whole (the System State), FDR/UPSTREAM/PC version 3.1.4e debuts a new feature called the SysState PlugIn (SysState.dll). The SysState PlugIn works in conjunction with another FDR/UPSTREAM/PC component called the FDR/UPSTREAM Windows 2000 Agent service (USW2KAgt.exe) that was introduced in version 3.1.4.

Note: If you are running a cluster, do not attempt to backup the system state of the virtual server; you must individually backup the system states of the nodes.

This section assumes that you are familiar with the individual components of the Windows 2000 System State, the requisite terminology and how to manage them.

Upgrading UPSTREAM

The System State PlugIn is intended as a single collection of all the items in the system state which were collected separately in earlier versions of UPSTREAM. Your existing backup specifications will still work, however they will not be able to take advantage of the single collection nature of the System State PlugIn. So we recommend that you modify existing backup specifications to include this new feature. Note however, that your first full-merge backup will run longer as the files are renamed to indicate that they are in the "System State".

SysState PlugIn Backups

The SysState PlugIn can be used with UPSTREAM to backup any Windows 2000 operating system machine. The only exception is that virtual servers defined in a cluster environment do not have their own system state (they inherit the system state of the cluster node that they're hosted on), so the SysState PlugIn should not be used. With UPSTREAM (and SysState.dll) running on any Windows 2000 computer in a domain, you can

backup any number of Windows 2000 computers within the same domain. The Windows 2000 computers to be backed up can be the local machine (the one on which UPSTREAM is run) or a remote machine (another Windows 2000 computer in the same domain). You can not use a Windows NT machine to back up the System State of a Windows 2000 machine.

The use of the SysState PlugIn removes the need to use the WinAD, CertServ and Cluster PlugIns since the functionality of these PlugIns has been included in the SysState PlugIn.

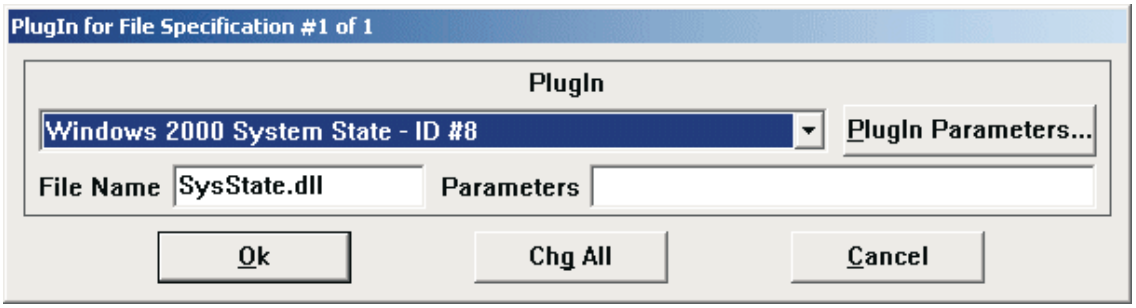
Some of the components of the Windows 2000 System State are always backed up fully regardless of the UPSTREAM backup type selected when you specify the System State PlugIn. Even when you specify that the backup should be incremental (backup type Incremental merge, MERGE=2), the following components are backed up fully, as Microsoft has not defined incremental backups for these objects:

- The registry.
- The COM+ Class registration database.
- The Active Directory database.
- The Certificate Server database.
- The Cluster database.

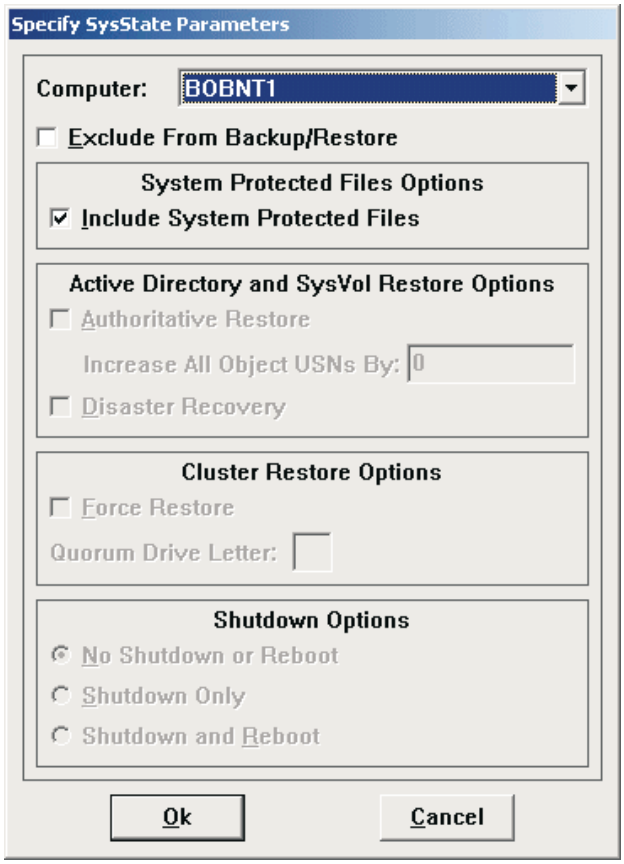
Because of the inter-dependencies between the various components of the System State, the SysState PlugIn backup will always include those components present on the computer being backed up. Although, the System State components can be restored individually, it is strongly suggested that the entire System State be restored as a whole so as not to break any of the inter-dependencies between the components. This is especially true when performing a disaster recovery restore as this can only be done by restoring the entire system state. System State components should be restored individually only when you are sure of what you are doing.

SysState PlugIn backups and restores can be restarted.

From the FDR/UPSTREAM program, to specify the use of the SysState PlugIn to back up the System State of a single Windows 2000 computer, pull down the **Action** menu, select **Backup** from the main UPSTREAM screen to display the *Backup Parameters* dialog. Press the **PlugIn...** button to display the *PlugIn for File Specification ...* dialog.



Pull down the combo box list of PlugIns and select **Windows 2000 System State**. To specify parameters specific to the PlugIn, press the **PlugIn Parameters...** button.



The parameters specific for backup include:

- **Computer:** This drop down list will be populated with the NETBIOS names of all of the computers in the local domain. In the above example, BOBNT1 is the name of a Domain Controller in the domain.

- **Include System Protected Files:** System Protected Files are operating system files which have been chosen by Microsoft to be key to operating system operations. These are considered part of the system state, but since they are operating system files, they can be recovered through other means (original media, service packs, etc.). Checking this option will increase the size of the backup substantially, but it is recommended whenever possible to aid in complete system recovery. The default is checked.

- **Exclude From Backup/Restore:** This checkbox is used for marking the file specification that uses the SysState PlugIn as an exclude file specification (SPECTYPE=1).

Press the **Ok** button to save your SysState specifications. Press the **Ok** button to return to the *Backup Parameters* dialog.

SysState requires a specific set of file specification parameters that it sets automatically. As a result, the *Backup Parameters* dialog does not allow you to modify the *Backup Specification* field or press the *Spec Detail…* button to alter the rest of the file specification parameters.

The SysState PlugIn may be used for multiple file specifications as long as the computer names are unique for each file specification. The SysState PlugIn may also be used in conjunction with other file specifications that do not use PlugIns or use other PlugIns as long as the other PlugIns also allow this combination.

Backups that include system state files will take a few seconds to display the initial backup status dialog. This is normal as UPSTREAM determines the contents of the system state.

Using SysState

The individual files that the SysState PlugIn passes to UPSTREAM to be backed up consist of a large number of real files along with a number of virtual files. The real files will be backed up with names that are similar to their real names, but slightly modified.

For example: the system state file \\computer\C$\WINNT\system32\NTDLL.dll will be backed up as \\computer\SysState\C$\WINNT\system32\NTDLL.dll.

The virtual files that are backed up by the SysState PlugIn are:

- \\computer\SysState\WinAD\WinAD.bin
- \\computer\SysState\CertServ\CertServ.bin
- \\computer\SysState\Cluster\Cluster.bin

However, if you are backing up non-local machines, or your local drives by UNC name, we highly recommend that you backup your System State using the System State PlugIn in all backups.

If the System State PlugIn is not used, and your file spec includes system state files, UPSTREAM will still backup these files. However, they will be backed up by their actual file name, not grouped together with other entities in the system state. This means that it may be difficult to restore the System State as a single entity in a disaster situation.

Although most users will want to backup up the C: drive along with the system state, it is now possible to create a backup that is only the system state. Such a backup can be used to perform a fast disaster recovery restore without having to restore the entire C: drive. This topic is discussed further in the *SysState Disaster Recovery* section.

Note: Active Directory backups (part of the System State for Windows 2000 Servers) have a maximum amount of time that they can be used for restore (a tombstone lifetime). The NTDS Backup API requires that each SysState backup contain an expiry token which controls how long the backup of the Active Directory remains viable.

The default tombstone lifetime is 60 days. Setting a different value on the NTDS configuration object can change this. Microsoft Knowledge Base article Q216993 explains how to do this. Whether you use the default tombstone lifetime or set a different value for it, you should plan on backing up your Windows 2000 System State at more frequent intervals. Even though you may not be interested in changing your default tombstone lifetime, you should still read KB article Q216993 since it references other KB articles which contain other useful information such as the impact of performing authoritative restores on objects needed to synchronize with other domains.

In a cluster, the virtual server does not have a system state so it should not be backed up. However, you do need to back up the system state on all nodes.

SysState PlugIn Restores

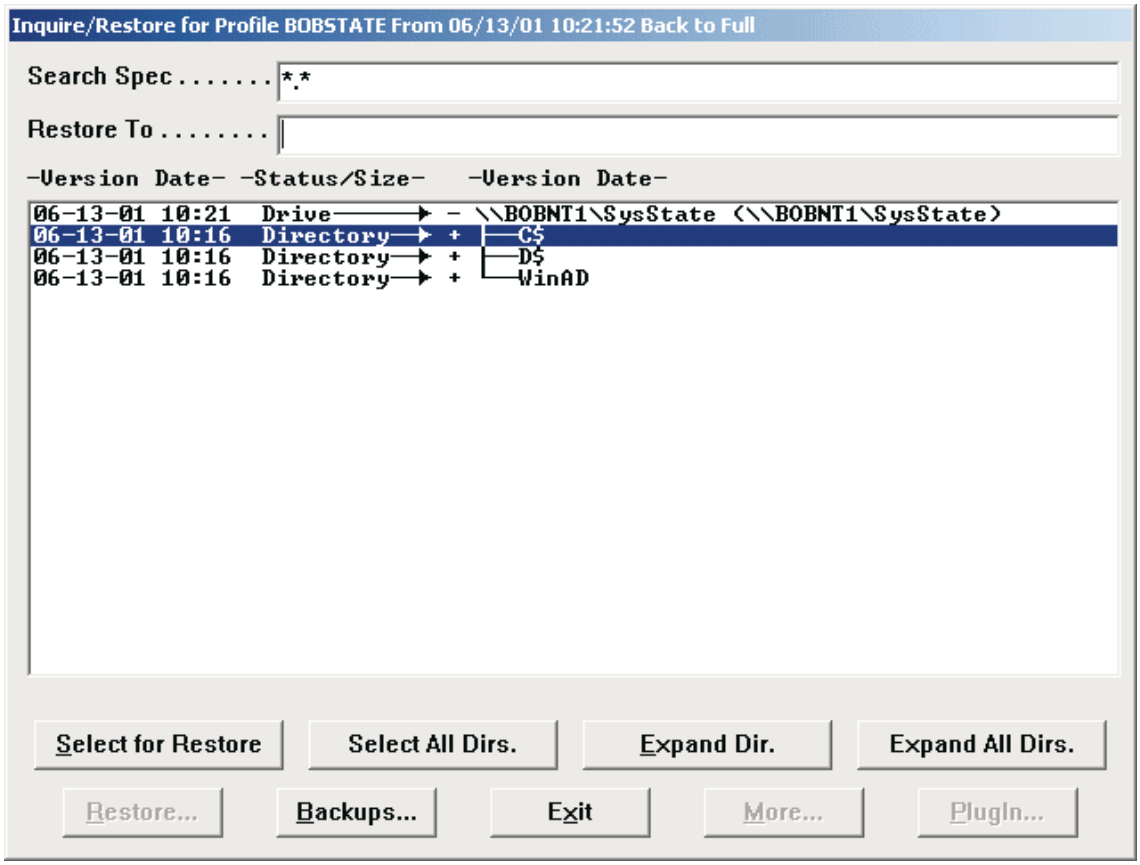
WARNING: System State restores should only be performed if you have a thorough knowledge of Windows 2000. In particular, partial System State restores can be especially dangerous. We highly recommend you review the Microsoft documentation and contact UPSTREAM technical support for assistance before beginning a System State Restore.

The SysState PlugIn does not allow you to restore the system state components to an alternate location. The location from which the real and virtual files were backed up will be the location to which they will be restored. Although the SysState PlugIn will allow you to restore the system state of one computer to another computer, this is discouraged with the exception being the replacement of one computer with another such as a disaster recovery

Another restriction that the SysState PlugIn checks for is that the Windows Active Directory server (Domain Controller) must be running in *Directory Services Restore Mode* (i.e. offline mode). To put the Active Directory server in this offline mode you need to reboot it and select the Directory Services Restore Mode from one of the Safe Mode options available at boot time, by pressing the F8 key during the boot process.

To start a restore from the computer to be restored or another Windows 2000 computer in UPSTREAM, pull down the **Action** menu and select the **List and Restore**. If your backup consists only of the System State you will see the List and Display dialog.

If the latest backup version of the current backup profile had multiple file specifications and one or more of these file specifications did not use the SysState PlugIn, the *Inquire/Restore PlugIn Selection for Profile ...* dialog will be displayed. From this dialog, highlight the **Windows 2000 System State** item and press the **Continue…** button to display the List and Restore dialog. Only the System State component of the backup will be displayed in List and Restore.



Please see the *SysState Disaster Recovery* section below before beginning any restores of the System State.

In the above example, the D drive is the boot drive. So if you expand the C drive's directory, you will only see the minimum number of files (boot.ini, ntdetect.com and ntldr) necessary for system boot up. If you expand the D drive's directory, you will see the bulk of the files and directories which include:

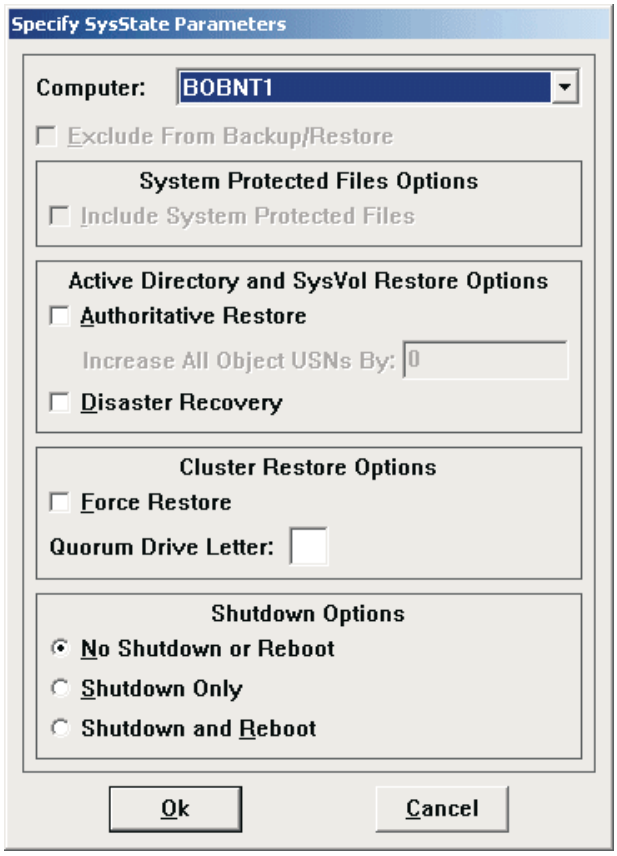
- The system protected files. This is the vast majority of the files. Many of these files are automatically updated when service packs are installed. But they are generally not updated otherwise.
- The registry. Generally stored in \WINNT\SYSTEM32\CONFIG, these 5 files (default, SAM, security, software and system) represent the core of the machine's configuration.
- The COM+ Class registration database. This is stored as a virtual file, COM+, in the same directory as the registry.
- The SysVol. Related to Active Directory, it is generally stored as files and directories in the \WINNT\SYSVOL directory. It should be restored at the same time as Active Directory.

Some other files displayed on this screen (in virtual directories) are:

- The Active Directory database (for Domain Controllers only). Displayed as the virtual file \WinAD\WinAD.bin
- Certificate Server database. (Not in the example above) in \CertServ\CertServ.bin
- Cluster server database. (Not in the example above) in \Cluster\Cluster.bin

In this dialog you will see all of the top-level file specifications that use the SysState PlugIn. Only the files for the file specifications that use the SysState PlugIn will be displayed. Find the file specification for the computer to be restored and select the drive specification (\\computer\SysState) to restore the entire system state or select one or more of the individual components to restore only a part of the system state. Then press either the **Select for Restore** button or the **Select All Dirs.** button to include these files (or virtual files) in the restore.

This will enable the *PlugIn*... button. The *More*... button will not be enabled since the SysState PlugIn requires complete control of the file specification parameters. Press the **PlugIn...** button to specify System State specific parameters. Press the **PlugIn Parameters...** button to display the System State dialog.



The restore specific parameters are:

- **Computer:** This drop down list will be populated with the NETBIOS names of all of the computers in the local domain. In the above example, BOBNT1 is the name of a Domain Controller in the domain.

The *Active Directory and SysVol Restore Options* include:

- **Authoritative Restore:** See the Authoritative Restore section below for a description of Active Directory and SysVol authoritative restores. Check this box to perform an authoritative restore.

- **Increase all Object USNs By:** Enabled if you check Authoritative Restore above, specify how much to increase the restored Active Directory object's USN (Universal Serial Number) to assure that the restored objects don't get lost in replication.

- **Disaster Recovery:** Enabled only if the *Authoritative Restore* checkbox is unchecked. Check this box to allow the proper restore of Active Directory on a system that does not have it installed (i.e. a Windows 2000 Server that has not been promoted to a Domain Controller). The *Authoritative Restore* and *Disaster Recovery* options are mutually exclusive. Disaster Recovery restores are valid only when the entire System State is being restored.

  See the *Cluster Server Restore*s section below before restoring a Cluster Server. The *Cluster Restore Options* include:

- **Force Restore:** Check this box to force the restore of a Cluster Quorum database. The default is not checked.

- **Quorum Drive Letter:** The drive letter of the quorum disk. This is **Q:** by default.

  Most of the System State objects require a reboot after being restored. The Shutdown Options allow you to specify shutdown after completion of the restore. Note that if you are restoring to another system (using a LAN drive letter or a UNC name) the system being shutdown is the one being restored to, not the system running UPSTREAM.

- **No Shutdown or Reboot:** The restore will complete and the system will not be shutdown. This option is useful in situations where you need to perform an Authoritative restore of only certain Active Directory objects, since this will require a manual invocation of the NTDSUTIL.EXE utility to complete the Authoritative restore of only these objects. Select this option with care.

- **Shutdown Only:** The system will be shutdown - you must manually restart it.

- **Shutdown and Reboot:** The system will be shutdown and immediately restarted.

  Once you have set the SysState PlugIn parameters to your liking, press the **Ok** button to return to the PlugIn for File Specification …dialog. You will now see the Parameters field filled in with a set of parameters modified based on your selections in the SysState PlugIn dialog. Press the **Ok** button to return to the List and Restore dialog.

Host Initiating System State Backups and Restores

Like all other UPSTREAM backups and restores, those that use the SysState PlugIn may also be initiated from the host via a USTBATCH job. The parameters for such a backup or restore are the same as any other backup or restore with the addition of the following parameters in the file specification section (i.e. after the SPECNUMBER parameter) for each file specification:

```
FILES \\computer\SysState\*.*
PLUGIN SysState.dll
PLUGINPARAMETERS COMPUTER=computer INCLUDESYSTEMPROTECTEDFILES=…
```

For backups, the correct format for the FILES parameter is not crucial since the SysState PlugIn will override it anyway and force it to be \\computer\SysState*.*. It does this by getting the real computer name from the PLUGINPARAMETERS value. For restores, the FILES parameter must be specified precisely for the system state components you want to restore. To restore the entire system state specify:

```
FILES \\computer\SysState\*.*
```

To restore only the real system state files, which are stored on the C drive, specify:

```
FILES \\computer\SysState\C$\*.*
```

To restore only the Active Directory specify:

```
FILES \\computer\SysState\WinAD\*.*
```

Or:

```
FILES \\computer\SysState\WinAD\WinAD.bin
```

PLUGINPARAMETERS are space separated, TITLE=VALUE, all on one line:

Title	Value	Context	Description
COMPUTER	Computer name of the computer to be backed up or restored.	All	Required for all SysState backups and restores, the computer name of the system to be backed up or restored.
INCLUDESYSTEMPROTECTED FILES	Y or N	Backup	Whether system protected files should be included in the backup. The default is Y.
AUTHORITATIVERESTORE	Y or N	Active Directory and/or SysVol restores.	Whether Active Directory and/or SysVol restores should be authoritative. The default is N.
OBJECTUSNINCREASE	Number	Active Directory and/or SysVol restores	An optional parameter that specifies the increase of the USN (Universal Serial Number) for every object in the Active Directory being authoritatively restored. The default is 0, meaning that the USNs are not to be increased. This parameter causes the SysState PlugIn to execute the NTDSUTIL.exe utility to perform an Authoritative restore function with a sub-function of Restore database verinc (number).
DISASTERRECOVERY	Y or N	Full system state restores	A n optional parameter that allows the proper restore of Active Directory in the case of a disaster recovery. The default is N.
FORCE	Y or N	Cluster Server restores	An optional parameter that indicates whether the restore of a Cluster Quorum database should be forced or not. The default is N.
QUORUMDRIVELETTER	Drive letter:	Cluster Server restores	An optional parameter indicating the cluster server quorum drive letter. The default is Q:.
SHUTDOWN	0 = No shutdown 1 = Shutdown without reboot. 2 = Shutdown with reboot.	Restores	An optional parameter that indicates whether the computer should be shutdown after a successful restore and whether the computer should then be restarted. The default is 0 (no shutdown).

An example of a complete set of parameters to backup the system state for the RON2000 computer would be specified as follows:

```
SPECNUMBER 1
FILES \\RON2000\SysState\*.*
PLUGIN SysState.dll
PLUGINPARAMETERS COMPUTER=RON2000 INCLUDESYSTEMPROTECTEDFILES=Y
```

An example of a complete set of parameters to perform an authoritative restore of the entire system state for the RON2000 computer and then reboot the system would be specified as follows:

```
SPECNUMBER 1
FILES \\RON2000\SysState\*.*
PLUGIN SysState.dll
PLUGINPARAMETERS COMPUTER=RON2000 AUTHORITATIVERESTORE=Y OBJECTUSNINCREASE=400000
              FORCE=N QUORUMDRIVELETTER= SHUTDOWN=2
```

Note that the values on the PLUGINPARAMETERS line must be on a single (continued) line in your host job.

Cluster Server Restores

To perform a restore to a Cluster Server node, only the node that is being restored to can be running the Cluster service. All of the other cluster nodes in the cluster must be stopped (i.e. not running the Cluster service). For this reason, you must manually shut down the Cluster service on all the other nodes. The exception to this rule is when you specify FORCE=Y sub parameter of the PLUGINPARAMETERS for the restore. In this case, the restore process will shut all of the other nodes in the cluster down.

Another requirement for a successful restore is that the quorum disk (Q: by default) must have the same partition layout (number of partitions and offsets to each partition) as the quorum disk described in the backup. If this is not the case, you must manually reconfigure the quorum disk to match the layout described in the backup. Again, the exception to this rule is when you specify FORCE=Y sub parameter of the PLUGINPARAMETERS for the restore. In this case, the restore process will attempt to reconfigure the quorum disk to match the disk described in the backup.

In the case where the quorum database is now on a drive other than the default Q: drive, specify the QUORUMDRIVELETTER=?: sub parameter of the PLUGINPARAMETERS for the restore. Use the form "?:", where ? is the drive letter of the quorum database drive.

In most cases you will not need to specify FORCE=Y or QUORUMDRIVELETTER=?: if you start the restore by manually stopping all of the cluster nodes for the cluster other than the node that you will be restoring to. Also, since the quorum database is shared between the various cluster nodes, it is not necessary to restore to all of the nodes of the cluster. Only one restore is required for an entire clustered system.

Authoritative Restore

A Windows Active Directory database (one of the components of the system state) is replicated between all of the Active Directory servers (Domain Controllers) in a given domain. When the Active Directory database is restored to any single Active Directory server, that database is as it was at the time it was backed up until the Active Directory server is started. At the time the Active Directory server is started, it undergoes a synchronization process with all of the other Active Directory servers in the domain. The result of this synchronization is that all of the objects with the highest Universal Serial Number (USN) are replicated to the other servers. This means that if any database object was modified between the time of the backup and the time of the restore, the

modified object has a higher USN than the unmodified object that was restored from the backup and as such, the modified object will be replicated back to the database that was just restored, thereby nullifying the restore.

To cause one or more of the objects in a restored database to not be overwritten by this replication process, they must be marked as being *Authoritatively Restored*. An object that is Authoritatively Restored has its USN increased so as to win the replication battle with other like named objects from the Active Directory databases of the other Active Directory servers.

To restore one or more objects authoritatively, two important steps must be performed:

- 1. The FDR/UPSTREAM restore using the SysState PlugIn must specify AUTHORITATIVERESTORE=Y
- 2. Either the restore must specify OBJECTUSNINCREASE=nn (where nn is the number by which the USNs of the Active Directory objects is increased) which will cause the SysState PlugIn (via USW2KAgt.exe) to automatically execute the NTDSUTIL.exe utility or the NTDSUTIL.exe utility must be executed manually after the FDR/UPSTREAM restore finishes, to mark the desired objects as being authoritatively restored.

NTDSUTIL.exe is a command line only utility program, installed as part of the operating system. NTDSUTIL.exe has many uses, one of which is to mark objects for authoritative restore. You must be booted in Directory Services repair mode to run NTDSUTIL.exe.

To start it, open a command line window and type NTDSUTIL at the command prompt. This will display the main ntdsutil prompt:

```
ntdsutil:
```

At the ntdsutil: prompt enter:

```
ntdsutil: authoritative restore
```

The prompt is now changed to:

```
authoritative restore:
```

At the authoritative restore: prompt enter:

```
authoritative restore: help
```

A list of available subcommands will be displayed. To authoritatively restore all of the objects in the database, use one of the following subcommands:

```
restore database
```

Or

```
restore database verinc %d
```

Where %d is some number.

To authoritatively restore only a subset of the objects in the database, use one of the following subcommands:

```
restore subtree %s
```

or

```
restore subtree %s verinc %d
```

where %s is the fully qualified display name (DN) of either an end node object or a container object and %d is some number. For example, to authoritatively restore a user object for a user named "Test User 1" in the "UPSTREAM2000.com" domain, enter the following:

```
restore subtree "CN=Test User 1,CN=Users,DC=UPSTREAM2000,DC=com"
```

Note the use of double quotes(") around the object name since it contains spaces.

The input to the NTDSUTIL.exe utility can be piped in from a file using the following command line syntax:

```
NTDSUTIL.exe <NTDSUTIL.IN
```

The manual execution of the NTDSUTIL.exe utility can be skipped if either of the following conditions is true:

- The PLUGINPARAMETERS does not contain AUTHORITATIVERESTORE=Y
- The PLUGINPARAMETERS contains AUTHORITATIVERESTORE=Y and OBJECTUSNINCREASE=nn with the value being something other than 0.

In the later case, the SysState PlugIn will execute the NTDSUTIL.exe utility for you. You should choose to execute the NTDSUTIL.exe utility yourself by specifying OBJECTUSNINCREASE=0 if you want to authoritatively restore only certain sub-trees of objects within the Active Directory database.

So, if the replication process effectively nullifies a restore, why would you ever want to perform a restore that was not an authoritative restore? A non-authoritative restore comes in handy when you are attempting to recover from a disaster in which you lost an entire Active Directory server. A non-authoritative restore of a server can be used to bring the server back up without necessarily causing any objects to revert back to the state they were in at the time of the backup.

SysState Disaster Recovery

In previous versions of UPSTREAM, if you wanted to restore just the operating system files, you had to restore all of the C: drive or know exactly which files needed to be restored and restore only those files. The use of the SysState PlugIn now gives you the ability to segregate the operating system files (the system state) from the other files that may reside on the C: drive. Furthermore, the SysState PlugIn groups all of the system state files together under one file spec even though the operating system files may reside one two or more drives (C: and D: for example). Because the system state files are grouped together, and do not include any files which are not system state files, it is easier and faster to perform a disaster recovery for a failed computer.

The disaster recovery procedure for a Windows 2000 system is slightly different than it is for a Windows NT system. The recommended Windows 2000 disaster recovery procedure is:

☐ 1. Reinstall the Windows 2000 operating system on the computer to be recovered. Make sure this is the same version of the operating system as what is on the backup to be restored (i.e. don't attempt to restore a Windows 2000 Server backup to a Windows 2000 Professional system). During the installation process, give the computer a name that is <u>different</u> from the one it had previously and add it to the domain it was previously a member of.

☐ 2. If the computer had Certificate Services installed on it previously, reinstall it.

☐ 3. If the computer was a member of a Cluster group, reinstall Cluster Services.

☐ 4. Reinstall FDR/UPSTREAM/PC if the restore is to be performed on this machine, otherwise make sure you have another Windows 2000 machine in the same domain on which you can perform the restore. Make sure the FDR/UPSTREAM Windows 2000 Agent service is installed and running.

☐ 5. If the computer to be restored to was a domain controller, reboot the computer into the Directory Services Repair Mode.

☐ 6. Start the UPSTREAM restore from either of the following:

- The actual machine to be restored if FDR/UPSTREAM/PC is installed on it
- Another Windows 2000 machine that has FDR/UPSTREAM/PC installed on it
- The mainframe via a USTBATCH job targeted to a Windows 2000 machine on which UPSTREAM is installed

☐ 7. In the restore specification specify the PLUGINPARAMETERS with a COMPUTER sub-parameter of the name of the temporary computer name assigned to the computer in step #1. If the backup was from a Domain Controller, you should also specify the following PLUGINPARAMETERS sub-parameters:

```
AUTHORITATIVERESTORE=N
DISASTERRECOVERY=Y
```

WARNING: The restore of the Active Directory will fail if DISASTERRECOVERY=Y is not specified for a domain controller.

WARNING: DISASTERRECOVERY=Y should only be specified for domain controllers.

If you want to have the system rebooted immediately after the restore, specify the following PLUGINPARAMETERS sub-parameter:

```
SHUTDOWN=1
```

for a shutdown only

```
SHUTDOWN=2
```

for a shutdown and reboot

☐ 8. Reboot the computer. When it starts, it will have the same name and characteristics of the machine from which the backup was taken.

☐ 9. You may now perform whatever other restores are necessary to recover your applications and data.

The procedure outlined here assumes that the set of hardware in the computer to be restored is the same as the hardware that was in the original computer that was backed up. If this is not the case, the disaster recovery procedure becomes more complicated. You may need to modify the restore somewhat to specify either NTREGRESTORE=1 or NTREGRESTORE=2 to cause UPSTREAM/PC to allow you to modify the registry before restoring it. Contact FDR/UPSTREAM Tech Support for further instructions.

Oracle Media Manager Support.

This new version 1.1.0.5 of Oracle Media Support (together with the new features of version 3.1.4e of FDR/UPSTREAM) provides full support for multi-channel RMAN backups on all supported platforms: SUN Solaris, AIX, HP-UX to add the prior support for Windows NT. This results in dramatically improved performance. There are also a number of other improvements the to agent including 64-bit HPUX support, new tape specification support.

To take advantage of this new feature you have to have FDR/UPSTREAM running as a service or daemon in an Attach Manager mode (default in v3.1.4e or later). You must also configure usorasbt to use FDR/UPSTREAM in a MULTI-user mode (see section 36.2.4 of the UPSTREAM v3.1.4 manual).

The backup profile that you specify must be configured on the MVS side as a generic one (using WSPREF in Backup Profile configuration); the UPSTREAM Oracle Media Manager support will take the specified backup profile (the **PROFILE** parameter) and add a number to the end for each channel. Thus the maximum number of characters for the PROFILE is 7 if you are using up to 9 channels, and 6 if you are using more than 9 channels..

We also now support the 64-bit version of Oracle on HP-UX. After you install/upgrade FDR/UPSTREAM on HP-UX, you will find 2 additional files:

- libobk.sl.64bit
- getret.64bit

These are 64-bit versions of *libobk.sl* and *getret* respectively. Rename these files and proceed with the regular installation procedure (see section 36.2.3 in the UPSTREAM v3.1.4 manual) keeping in mind that the directory for shared libraries for 64-bit Oracle on HP-UX is $ORACLE_HOME/lib64.

New environment variables:

- NEWTAPE was added to allow you to have full control over the creation of new tapes for your RMAN backups. When configuring your Oracle database backup profile, check “New Tapes for Full Merge” (NEWTAPEF YES in the ISPF Configure Profile screen) and don’t check “New Tapes for Incr. Merge” (NEWTAPEI NO in the ISPF screen). Now, if you specify NEWTAPE=FULL in the environment variables list in the RMAN script, UPSTREAM will create a new tape for the backup. If you have no NEWTAPE environment variable set or have NEWTAPE=INCR, UPSTREAM will append the current backup to the tape with the previous backup(s). See section 36.2.5 in the UPSTREAM v3.1.4 manual for instructions on how to specify environment variables for FDR/UPSTREAM in a RMAN script.
- USBKPROFILE - the FDR/UPSTREAM backup profile name to overwrite the value set by PROFILE parameter in the **usorasbt** configuration file (or to set it if PROFILE was not defined).

Two additional error messages were added:

- 151 – Incomplete buffer received from UPSTREAM. Internal error. Call Tech. Support.
- 152 – Invalid NEWTAPE setting. Must be either FULL or INCR.

Backup Management Suite for Oracle databases.

The UPSTREAM Backup Management Suite version 1.1.5 (included in UPSTREAM v3.1.4e or later) has been modified to support easier setup and configuration. Now you don't have to install a separate copy of FDR/UPSTREAM to run Oracle Backups – in your *usorback* configuration you can refer to the already installed version of FDR/UPSTREAM as long as it is version 3.1.4.c or higher.

You can also run backups and create schedules for multiple Oracle instances installed on one machine from one installed instance of the Backup Management Suite.

Finally, you can run parallel backups of different Oracle instances as long as you specify different backup profiles for them (the default is the database instance name).

To make all this possible the following changes in the naming conventions were made:

- All the following files have an Oracle instance name (ORACLE_SID value) reference in their names:

```
connect.<ORACLE_SID>.dat
constr.<ORACLE_SID>.dat
startup. <ORACLE_SID>.sql
shutdown. <ORACLE_SID>.sql
OFFLINE.<ORACLE_SID>.CMD
usorback.<ORACLE_SID>.cfg
```

- All files created from the Scheduler (using the GUI) or by the *usormgr* utility have an Oracle instance name (ORACLE_SID value) reference in their names:

```
USORA_nn.<ORACLE_SID>.CMD
USORA_nn.<ORACLE_SID>.LST
USORABKP.<ORACLE_SID>.CMD
USORABKP.<ORACLE_SID>.LST
```

For compatibility with the current installations, version 1.1.5 will still work with existing configuration files (without the Oracle instance name in the name), except for usormgr in /R (run next schedule) and /D (dynamic scheduling) modes. If you run usormgr with /R, you will have to recreate your schedules with this new version of usormgr or from the GUI. If you run usormgr with /D, your backups will start from scratch.

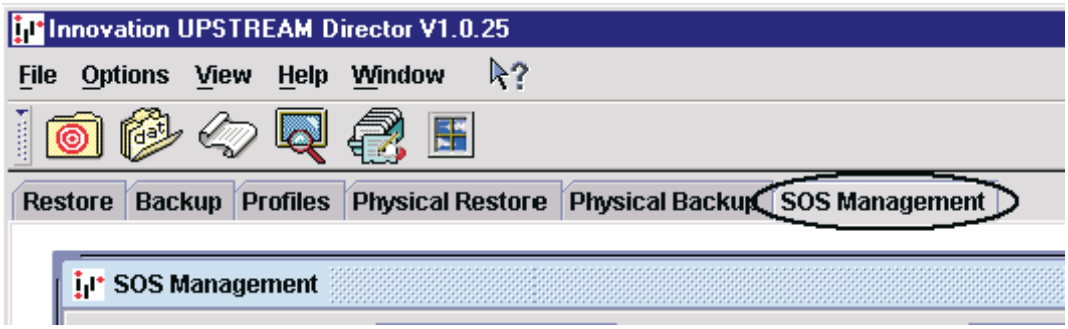
To be able to successfully work with FDR/UPSTREAM installed as root, usorback and usorrest must have root (superuser) as an owner and have the set-UID bit on (that makes these utilities run as root). Since you must run usormgr as an Oracle user, and since it doesn't work directly with FDR/UPSTREAM, it doesn't have these settings.

If root is not a member of the Oracle group, you may experience difficulties connecting to the Oracle database. To solve this problem a new command line parameter: **ORACLE_USER** was added for usorback and usormgr (to pass to usorback in scheduler scripts). In UNIX usorback will change it's user-ID to one of the specified users for database access.

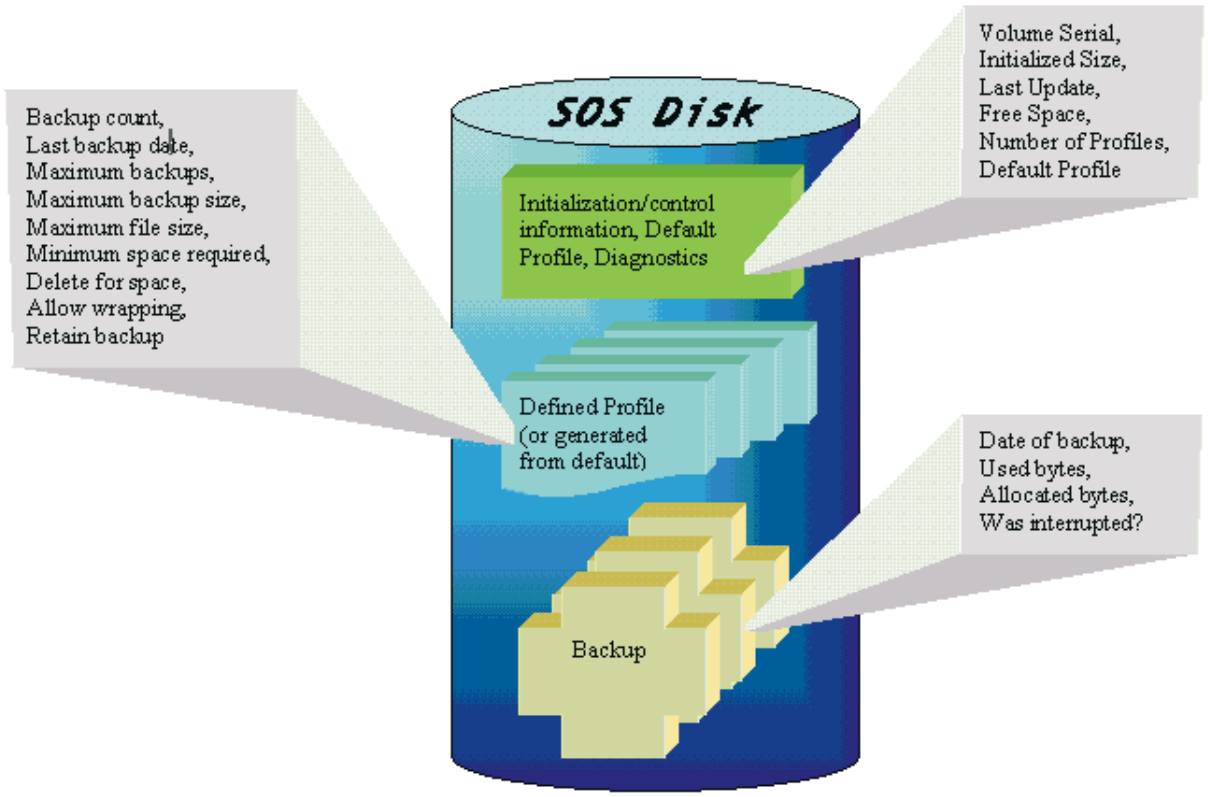
UPSTREAM Director FDRSOS Local Backup Disk Management

Introduction

For those who have licensed UPSTREAM/SOS, a feature which uses EMC disks shared between a server and the host to transmit/store backup data, this tab panel manages the SOS Initialization information, default profile, profiles and backups on these UPSTREAM/SOS disks. To use SOS Management in the Director you must have v1.0.25 of the UPSTREAM Director (or higher) and be connecting to v3.1.4e of UPSTREAM (or higher).



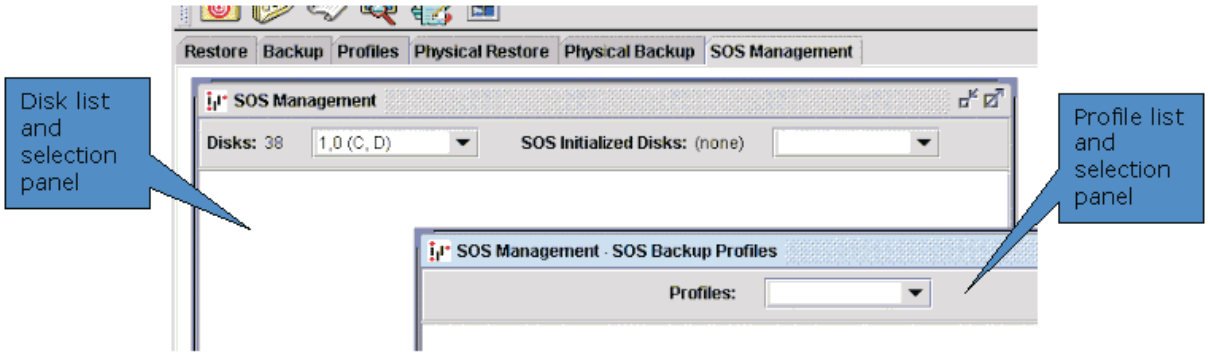
Actually, all disk drives on the server can be viewed and listed, but only the SOS initialized disks are managed and operated on. So, what exactly do we need to manage and control on an SOS disk?....the following figure shows three areas that we are interested in: Initialization/control and default (profile) information, Defined/generated profiles and the Backups themselves:



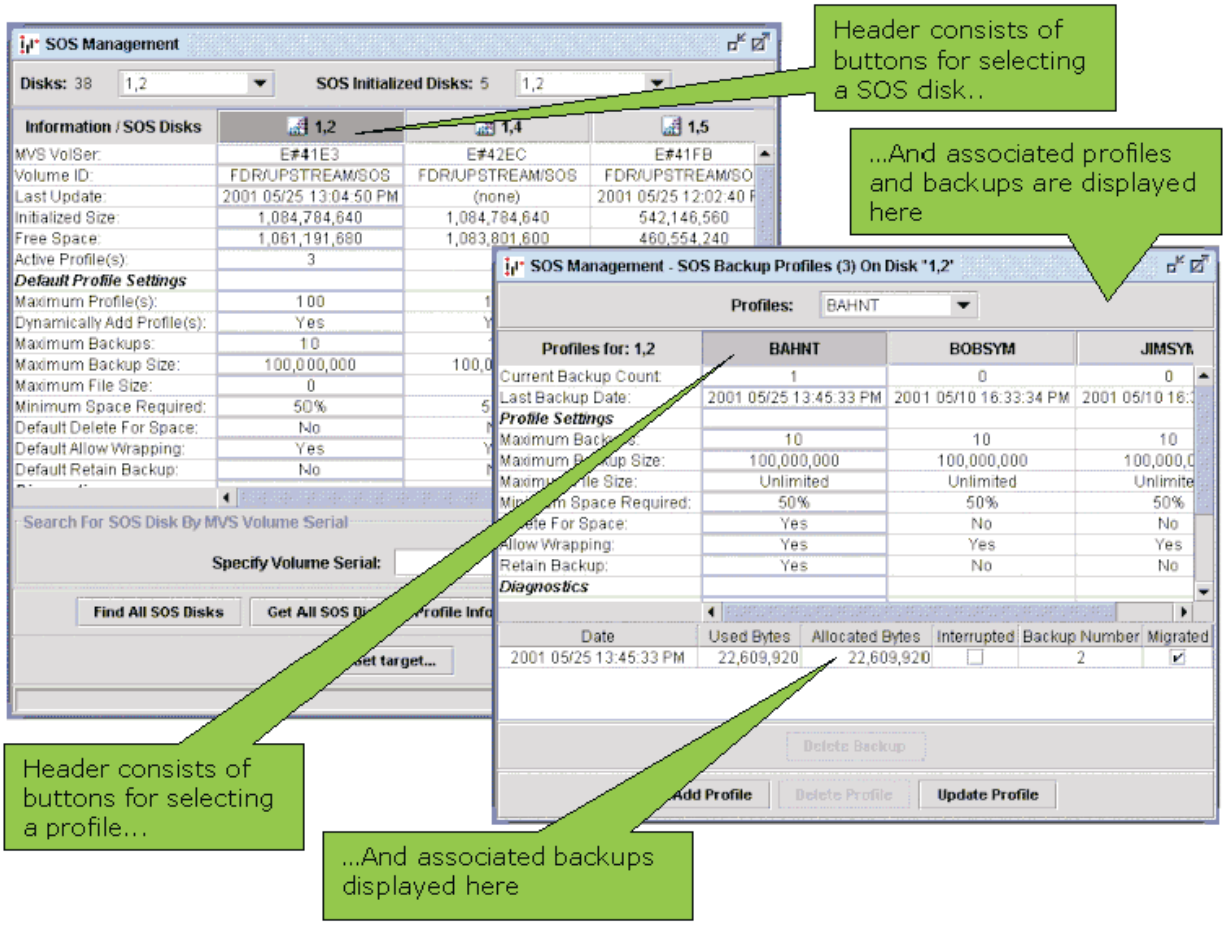
Using the SOS Management panels you can list your physical disks and see which ones are initialized for FDRSOS Local Backup, display all the above information about an SOS Disk, update the profile defaults for un-defined (generated from these defaults) backup profiles, display, add, delete and update the parameters of any backup profile, display and delete (without deleting the actual backup in the repository) the backups by profile.

First Look

SOS Management consists of two panels that work together to present the information on an SOS disk. The first panel is used to list the physical disks, SOS disks and the information on an SOS disk including the initialization information, default profile values and some diagnostics.

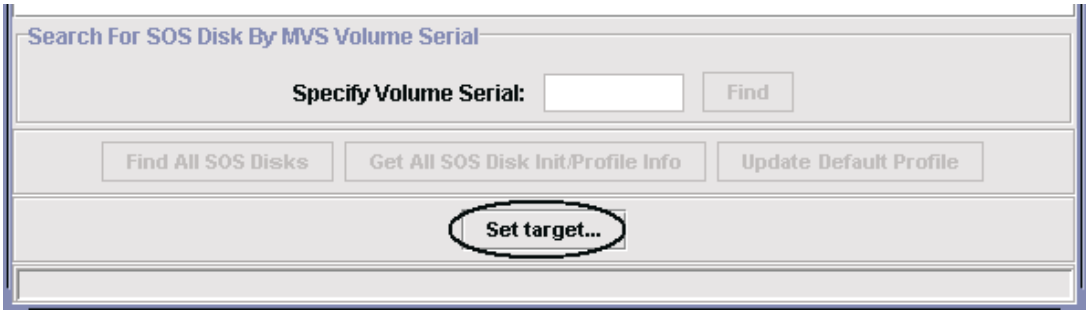


Selecting an particular SOS disk from this panel retrieves and displays the profiles and backups for that disk in the second panel:

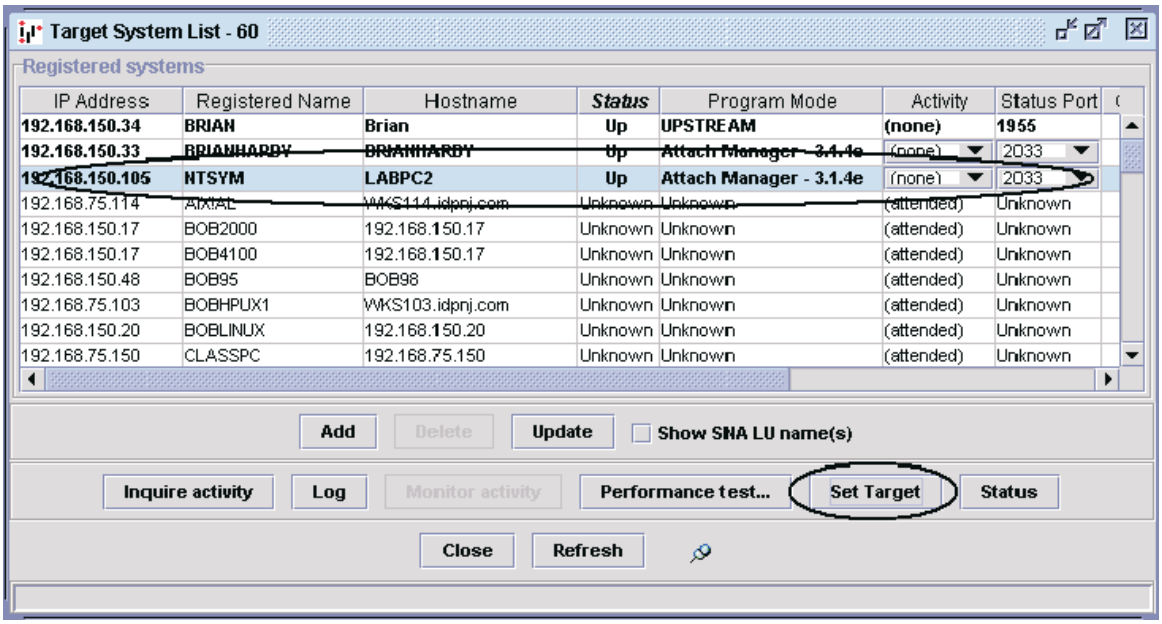


Setting Target - Gets The List Of Physical Disks

As with most tab panel actions, we must first set a target server for SOS Management where we will get the list of physical disks and manage the SOS disks:



Hit the "Set target..." button to bring up the Target Servers List:

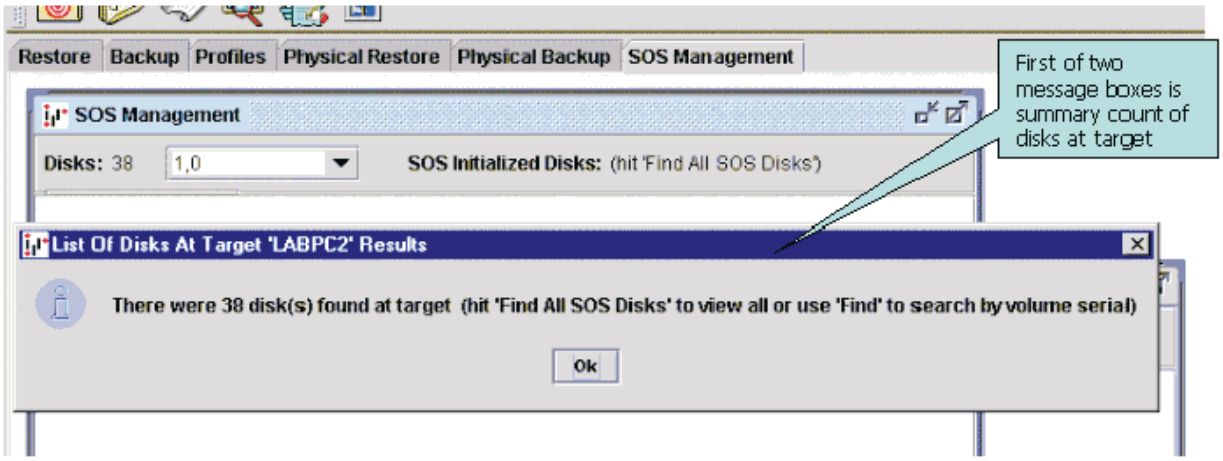


You can bring the list of active target servers to the top of the list by sorting the "Status" column in descending order: click once on the Status column header to sort ascending (regular font shows), then click once more to sort descending (slanted Italic font shows). Select a target server by clicking on the row to highlight it.

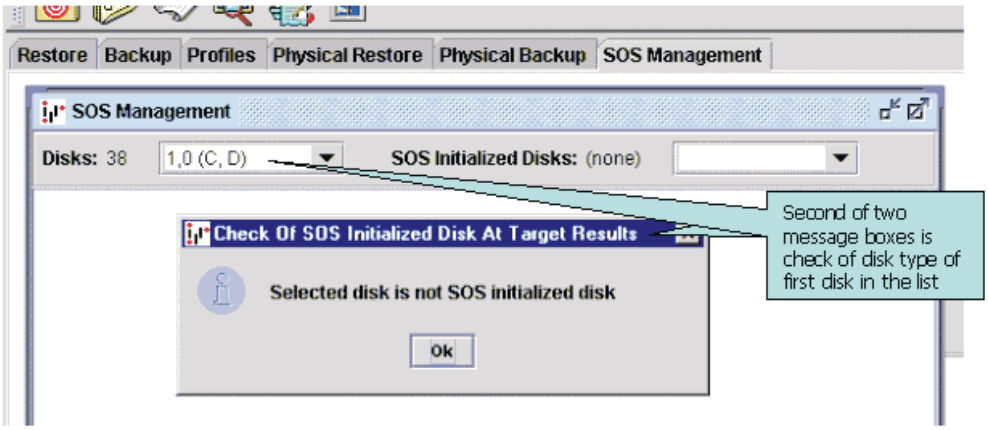
The two SOS Management panels are designed to get and display information in stages from the target server after a target is set. Information is gathered by doing read operations against the physical disks installed at the target server. Before you hit "Set Target" to set the target server for SOS Management however, you should be aware of the two preliminary operations this will initiate automatically.

The first operation performed after the target is set is to get the list of physical disks itself - with this list the drop down combination box labeled "Disks" on the top left side of the SOS Management panel is filled in and be-

comes available for selecting a particular disk to interrogate and display information about. A summary of the number of disks found is displayed in a message window displaying the results of this operation:



Once the combination box is filled in, the first entry or disk is automatically selected - so information about that disk is retrieved from the server next. You will see the results of this after you dismiss this message window by clicking on OK. Another message window now displays showing the results of the selected disk (the first entry in the "Disks" drop down combination box). This disk is interrogated (read) to determine if it is an SOS Disk or not and if so the SOS information is gathered. The message window that pops up informs you which is the case.



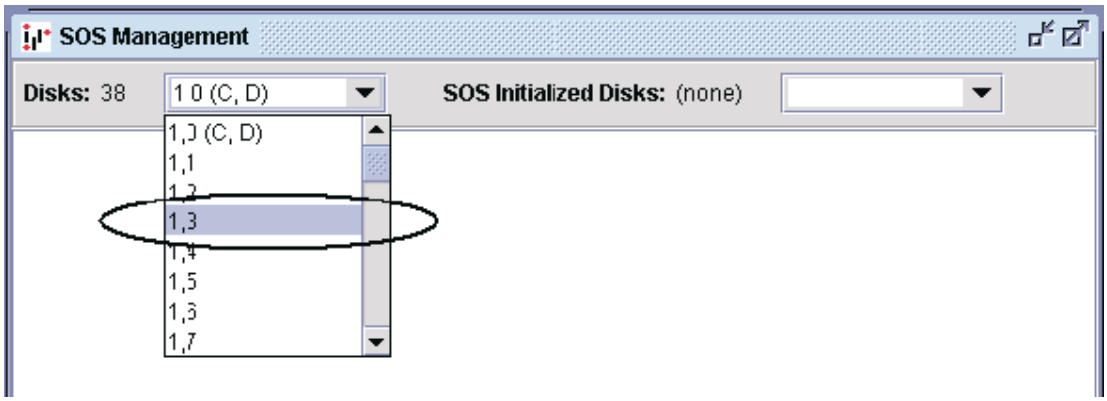
Once you dismiss this last message window if the first disk is not an SOS Disk (almost always the case), the drive letter or name (depending on the OS type of the target server) is filled in next to the disk number in the drop down combination box.

Disk Selection, Finding and Displaying SOS Information

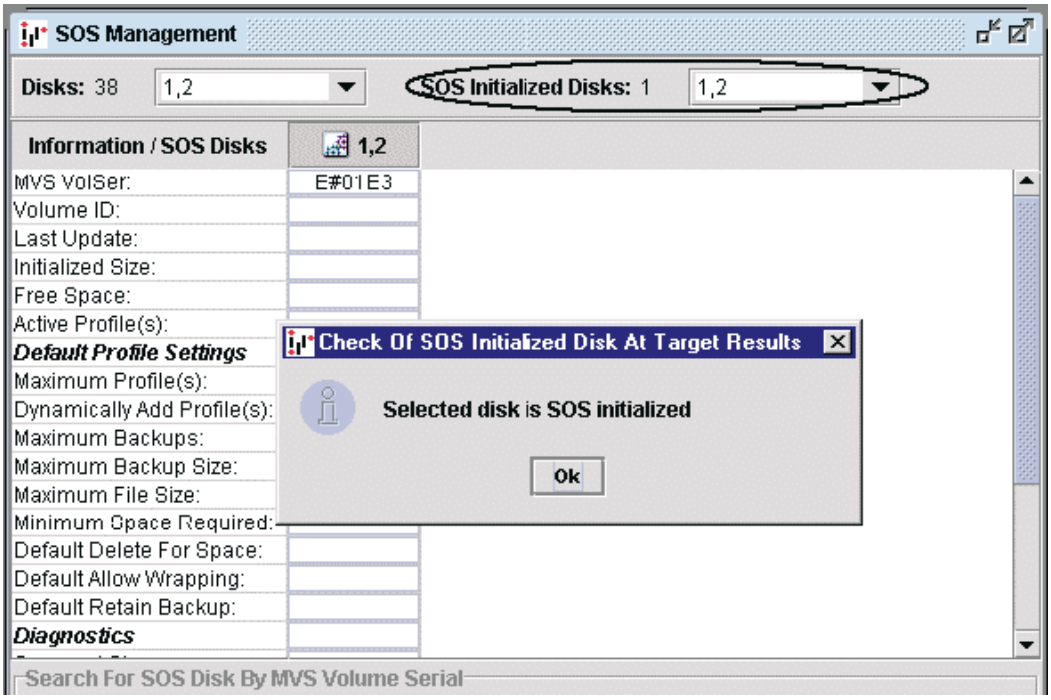
Remembering that the SOS Management panels are designed to get and display information in stages, after the target has been set, the only information available is the list of physical disks at the target server. Only the first one has been interrogated and this is probably not an SOS disk and therefore no SOS disk information is displayed.

Next we might follow one of the two suggestions of the message box displaying the physical disk count which were either: to hit "Find All SOS Disks" or use "Find" to search for an SOS Disk by volume serial name. Either of these may be appropriate but there is yet another alternative: that is to merely use the Disks drop down combination box list to select a particular physical disk that will be interrogated. This was done automatically to the first disk in the list when the target was set. This selection results in reading the particular physical drive to discover whether it is or is not an SOS disk and if so, the SOS information is read and displayed. So there are actually three different ways to discover what physical disks are SOS disks and to display the SOS information on them.

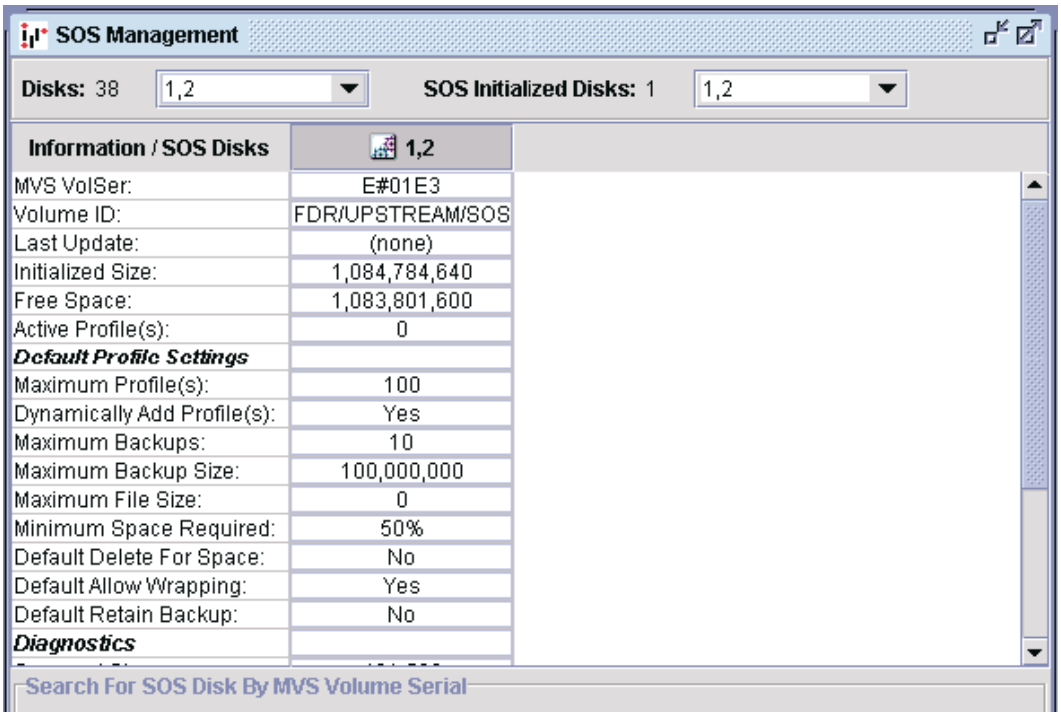
Lets look at this last method, which is to just select one of the disks from the Disks drop down combination box list. This is useful when we know which physical addresses are SOS Disks and we only want to interrogate that particular disk. Selecting a disk results in discovering if the physical address is an SOS Disk or not and then displays SOS information if it is:



Depending on the target system operating type, additional information is added when possible; in this case the target was a Windows system so the drive letter was filled in. If the disk we select is in fact an SOS Disk we would get the message box reporting this and the disk will be added to the list below:



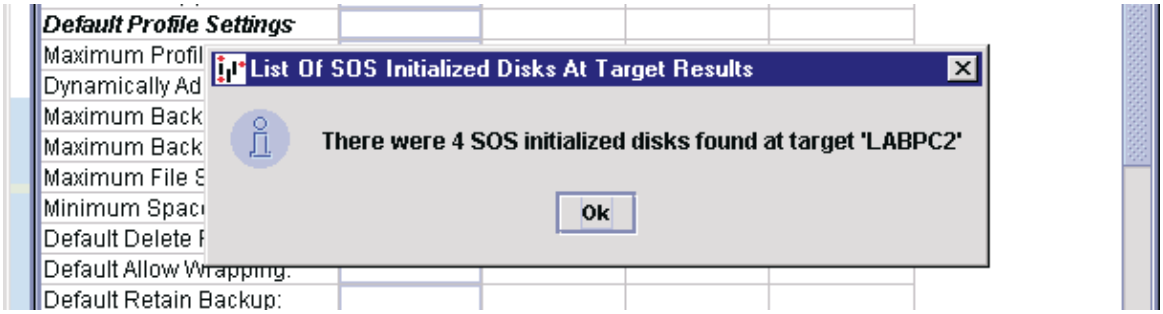
The third physical disk selected is an SOS Disk and is reported as such. It is added to the SOS Initialized Disks drop down combination box list and added to the display list below. Notice how in the display list the SOS information is not yet filled in, this is because as stated earlier, information is interrogated from the disk at the target in stages. When the message box is dismissed by hitting "Ok", the SOS Information will be gathered and filled in:



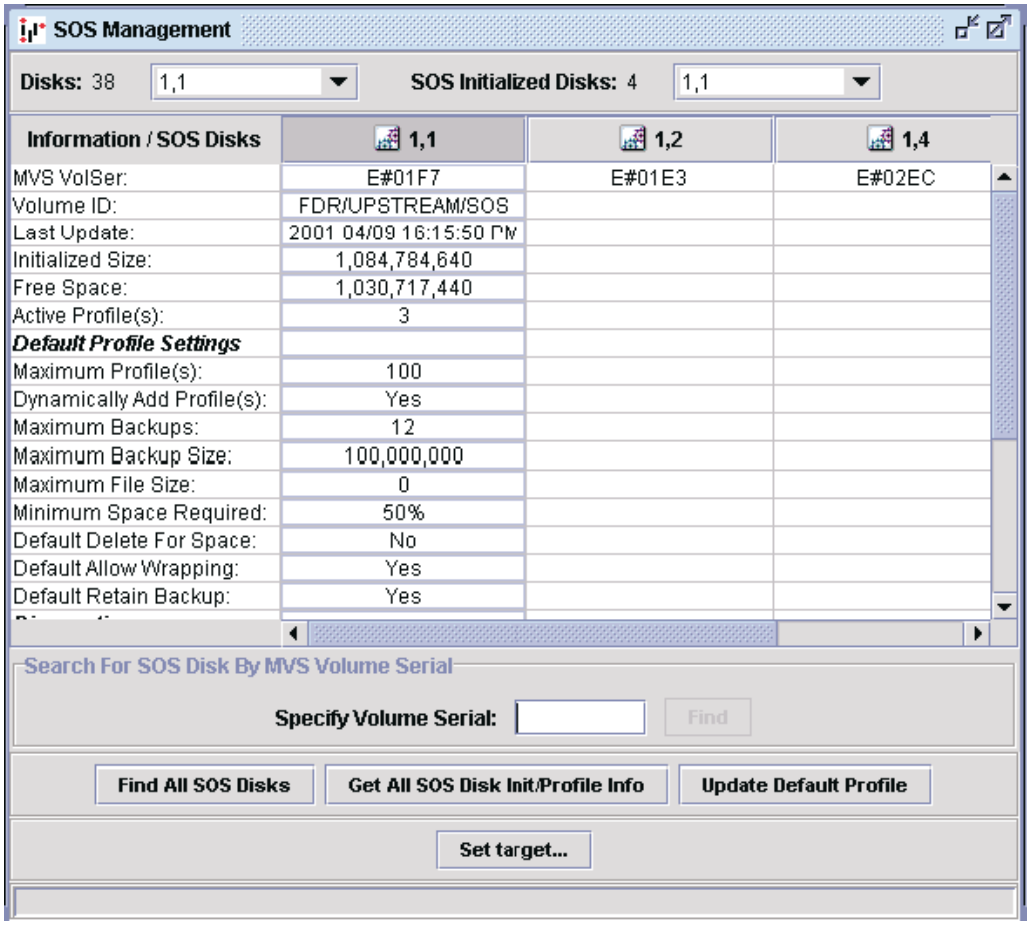
As we will see, whenever we find an SOS Disk to put in the list, the actual detailed SOS information is not filled in unless the disk is selected using either of the combo boxes or by clicking on the header line "Information/SOS Disks" along the top. This line is a row of buttons that can be selected by clicking once on them.

Next lets look at the second and most convenient method which is to just find all the SOS disks in one operation. Hitting the "Find All SOS Disk" causes all the drives to be interrogated to discover which ones are indeed SOS initialized disks. This operation ONLY builds the list of SOS Disks but does not yet read and display SOS information for any disk but the first (selected) one at this point. The progress of interrogating all the drives at the target server is shown in a status line at the bottom of the panel:

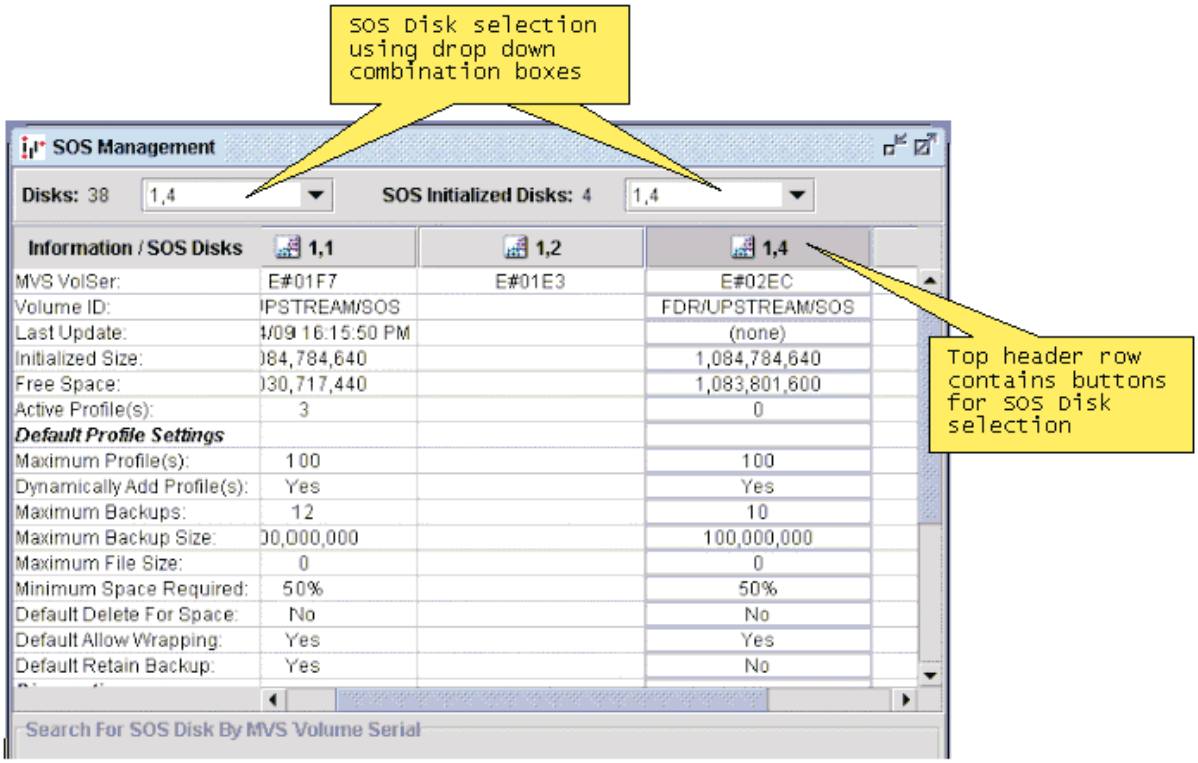
When finished, a message box is displayed giving the results (count of SOS Disks):



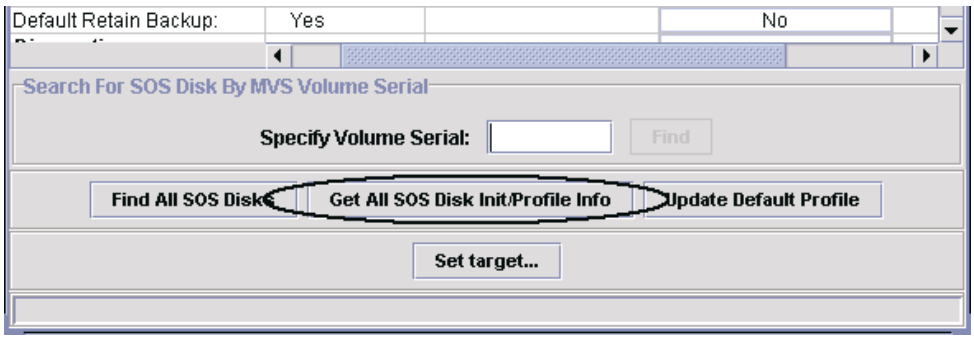
After dismissing this message by hitting "Ok", the list of SOS Disks is shown and the SOS Disk information for the first SOS Disk is displayed:



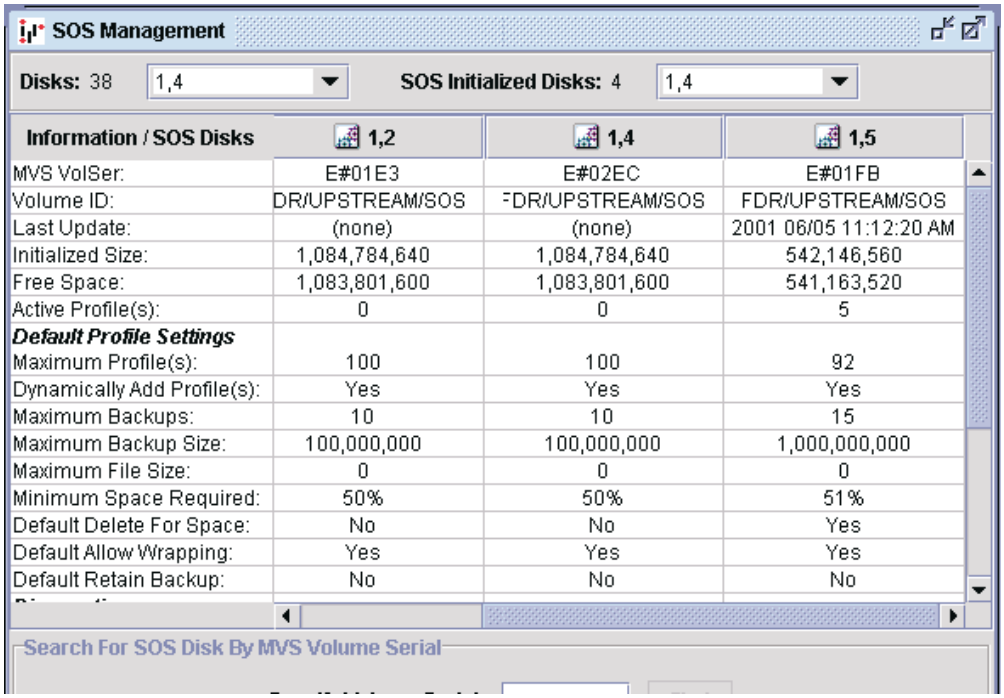
As noted before, the row header titled “Information / SOS Disk” contains a set of buttons for each SOS Disk to select. Once selected, the SOS detail information is filled in:



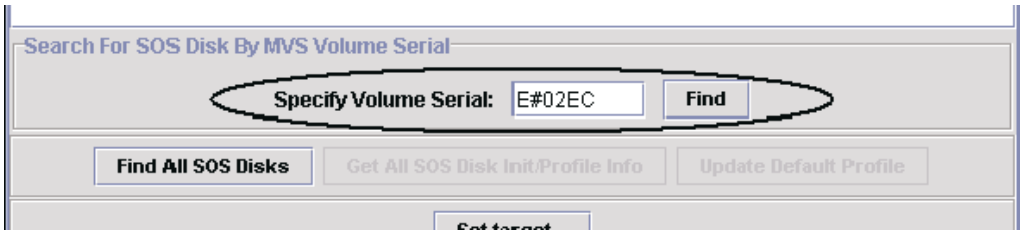
Whenever a SOS Disk is selected, the SOS information is filled in. Also the corresponding Profiles and backups are displayed in the partner panel "SOS Backup Profiles". Instead of selecting each SOS Disk to fill in the information, you can have all the information for every disk filled in by hitting the "Get All SOS Disk Init/Profile Info" button:



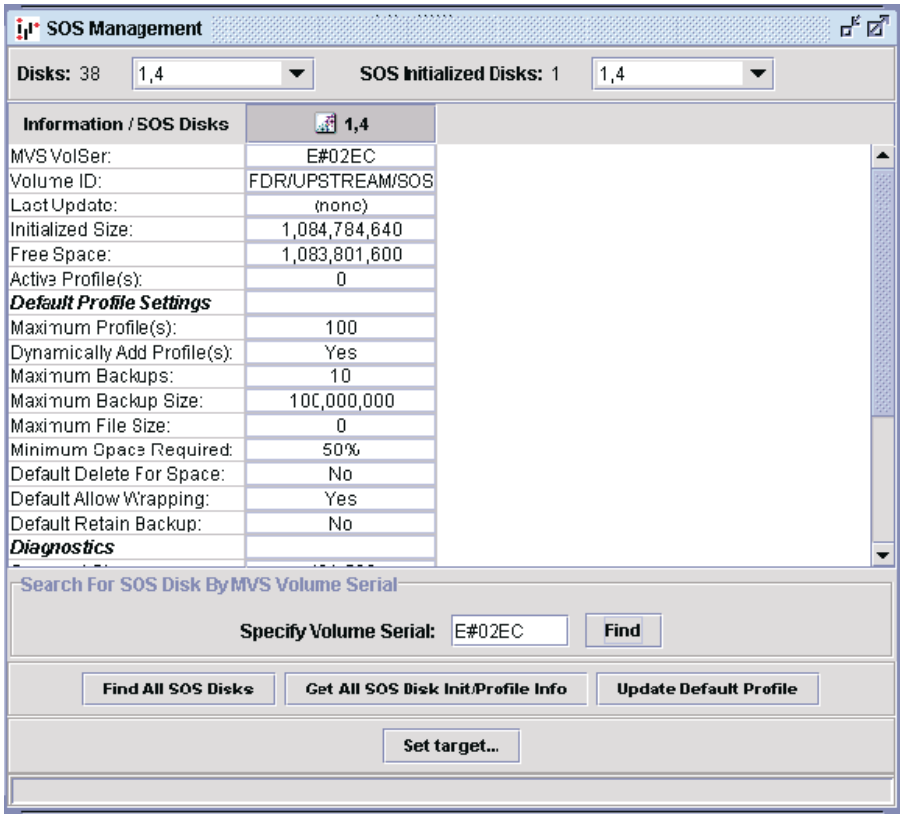
This will cause all the information to be gathered from every disk and filled in:



The last method we have for displaying SOS Disk information is to search for it by the MVS Volume Serial name given to a disk when it was initialized as an SOS Disk. We most often know the SOS Disk by its initialized volume serial name and so we can search for it by this name:



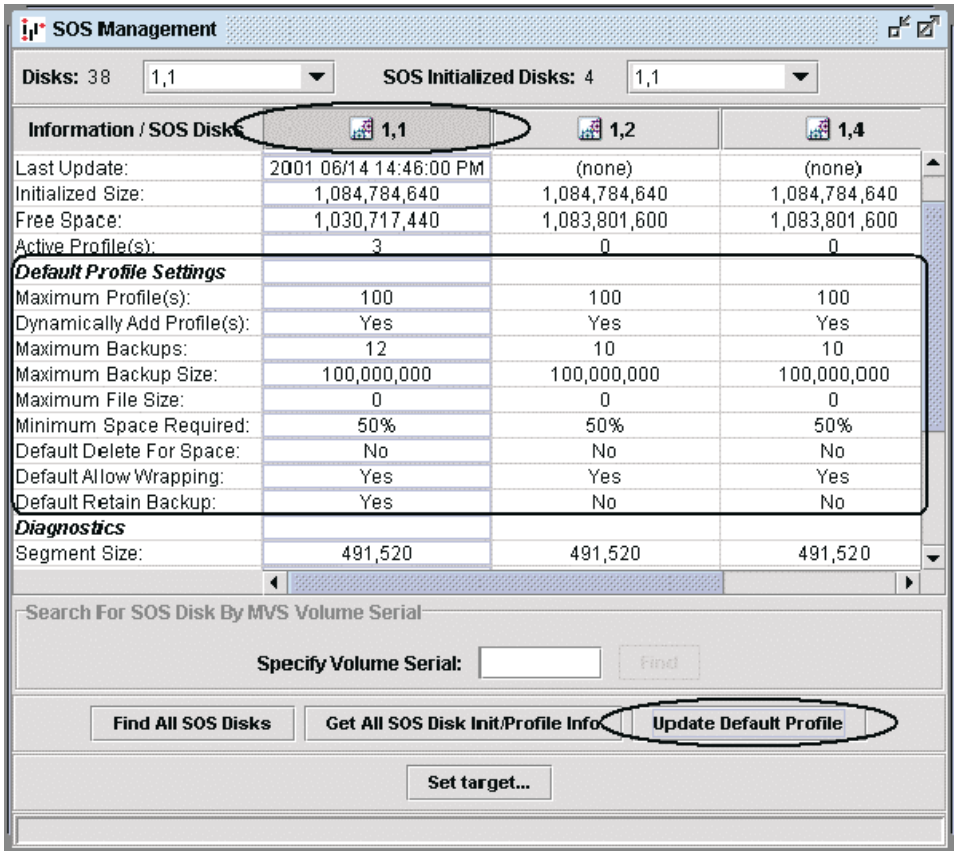
Once you type in a name to search for, the “Find” button is enabled for you to click it and start the search:



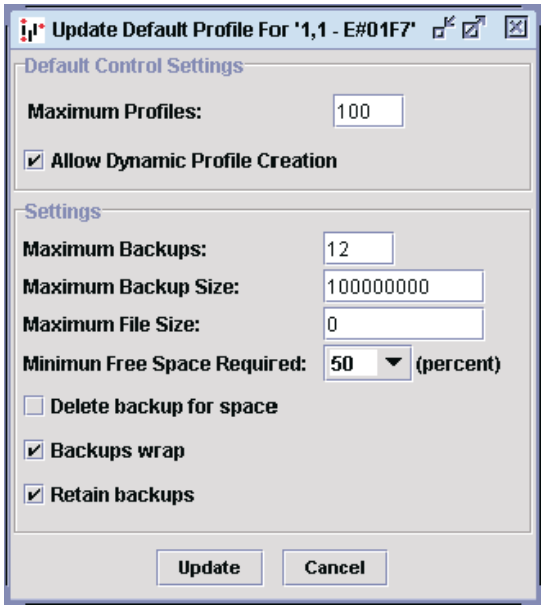
If found, the SOS Disk information is displayed.

Default Profile Settings, Profile and Backup Display and Management

The default profile control and settings are displayed in the rows following the row titled “Default Profile Settings” and are shown outlined below.

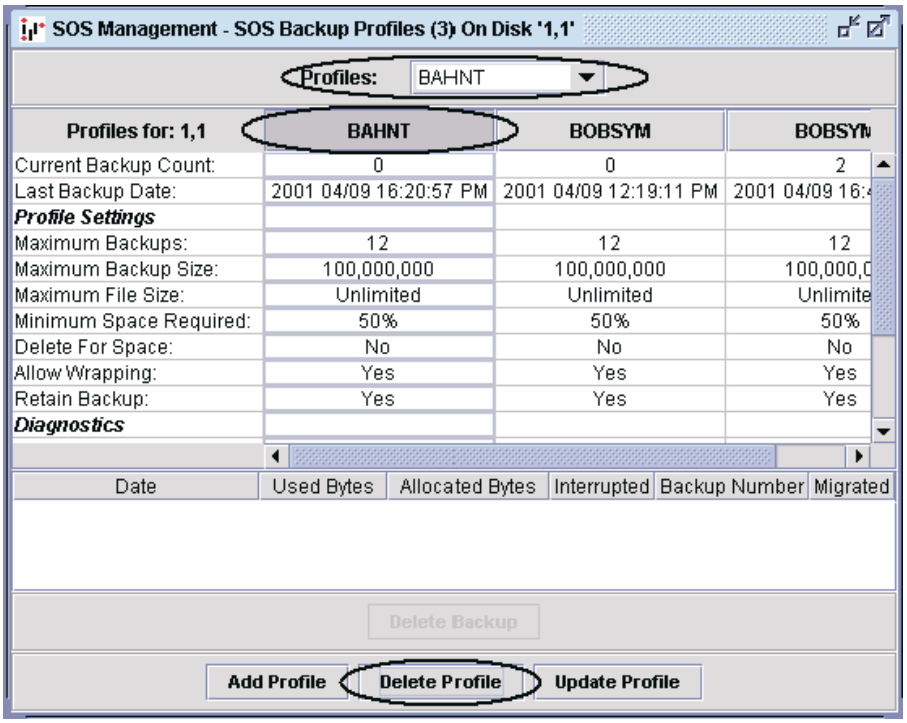


Whenever the control setting “Dynamically Add Profile(s)” is “Yes” and an SOS backup is performed with an un-defined profile, a new profile is created with these settings. You can update the control settings and these default parameter settings by selecting an SOS Disk and hitting the “Update Default Profile” button - the following dialogue is displayed:

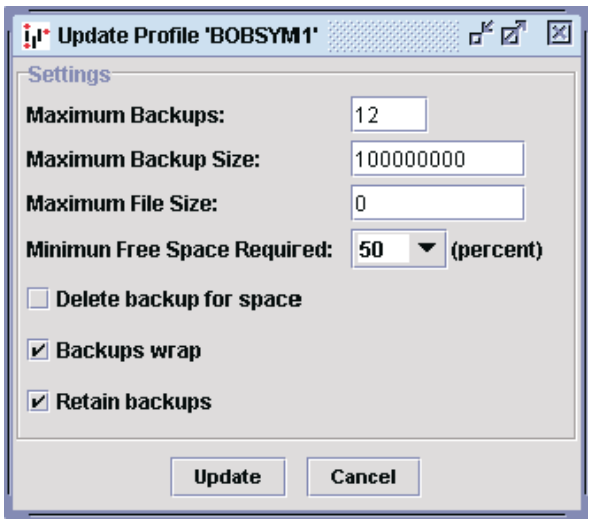


You can hit “Update” to make the changes or “Cancel” to abort and changes.

Whenever a SOS Disk is selected with either the “Disks” or “SOS Initialized Disks” drop down combination boxes or by hitting the header button for the SOS Disk, the current defined profiles and profiles dynamically added are displayed in the partner panel “SOS Backup Profiles” for that selected disk:

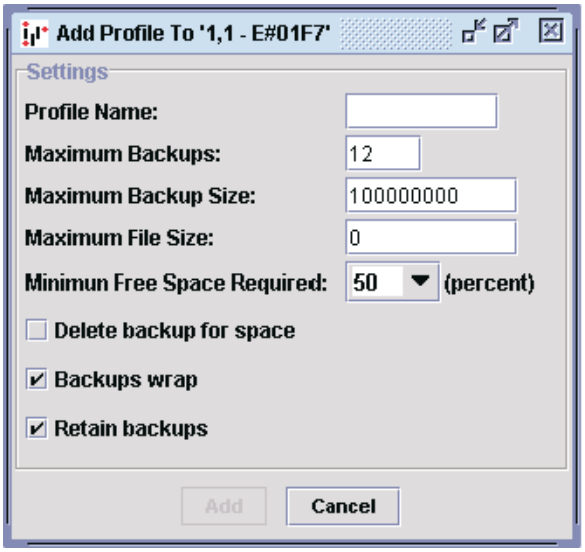


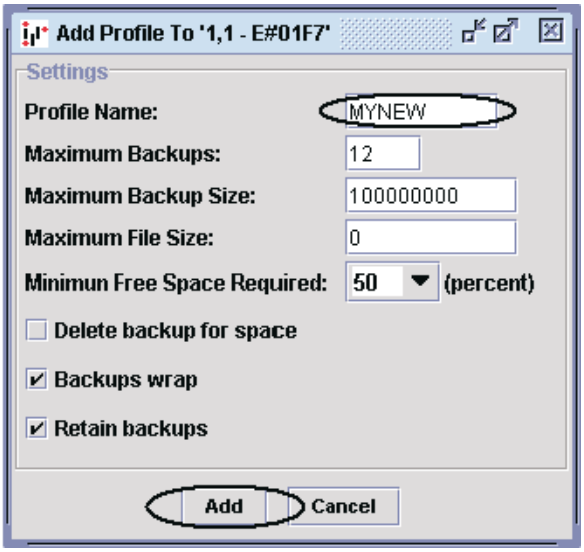
This panel also uses a drop down combination box (labeled "Profiles") and a header row of buttons for profile selection. The backups done with the selected profile are displayed in a list below. In this case there are none and so the "Delete Profile" button is enabled for you if you care to delete the selected profile. You may update the profile selected ("Update Profile" button) or you may define a new profile ("Add Profile" button):



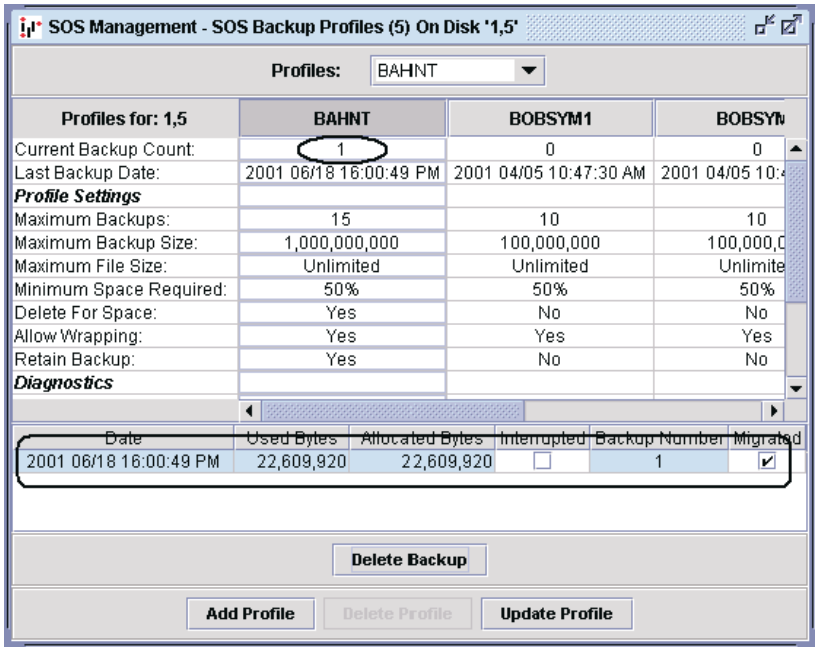
To update a profile, make the desired changes and hit the "Update" button or hit the "Cancel" button to abort any changes.

To add a new profile, you must first type in a name (1-8 characters) which will enable the "Add" button which you can hit after you have set all the profile settings you desire. The "Cancel" button aborts any profile creation.





Any backups taken with the selected profile are listed in the table in the lower half of the panel. In the following case there was one backup taken (and kept) with the profile "BAHNT":



Any backup displayed may then be selected by clicking on the row to high-light it and then hit the “Delete Backup” button.

Linux x86 Local Backup Support (v3.1.4e)

You can now use FDR/UPSTREAM's UPSTREAM/SOS local backup disks on most x86 Linux systems. Previous versions of FDR/UPSTREAM did not support local backup disks because character disk devices, required for application access to physical disk drives, are not part of the standard Linux kernel. To use this facility you must be running a Linux distribution that includes *rawio*.

Linux distributions based on the 2.2 kernel will only have *rawio* if the *rawio* patch was applied to the base Linux kernel; some of these include recent versions of RedHat, SuSE and TurboLinux. Linux distributions based on the 2.4 kernel should have *rawio* support built in.

To verify if you have *rawio* support installed, run the **raw** command. This command is part of *rawio* and is used to set and query block devices bound to a raw (character) device. When run with no arguments, the **raw** command will display its usage. If the command is not found you probably do not have *rawio* incorporated into the kernel on your system.

However, some distributions may not install the **raw** command if you do a minimal installation and the **raw** command is in a package that is not part of that distribution's minimal package set. In this case you should look on the installation media for a package with a likely name of **rawio**. The package containing the **raw** command must be installed, as this command is required to setup the device that will be used as the local backup device.

Linux *rawio* notes

Unlike UNIX operating systems, Linux does not create character device files for disk devices. To access a raw disk, the disk block device file must be bound to a raw character device file with the **raw** command. It should be noted that these bindings are not persistent and must be established every time the system is booted. It should also be noted that the *rawio* patch incorporated into the 2.2 kernels probably does not contain support to unbind a raw device. You must reboot a system without unbind support in order to clear unwanted or incorrect raw device bindings. If a recent kernel update is available for your Linux distribution (dated after January 2001) that you have not installed, it might contain the updated *rawio* patch that adds unbind support.

If your system has the updated version of rawio, you can unbind a raw device by using the raw command to bind it to major number 0 and minor number 0. On systems without the updated rawio patch, the use of major number 0 and minor number 0 will be rejected.

Setup

Raw disk access is provided by *rawio* through device files created with the mknod command with a major number of 162 and a minor number between 1 and 255. There is also a file that is used to perform *rawio* control operations that has a major number of 162 and a minor number of 0. FDR/UPSTREAM uses this file and assumes it is named **/dev/rawctl**. Most Linux distributions with rawio will already have this file. Some Linux distributions may be using raw device file names based on an early *rawio* patch, or may have created raw device files using names unique to that distribution. In either case you will have to create **/dev/rawctl** with the mknod command. You must be the root user to use mknod. To create /dev/rawctl, enter:

```
# mknod /dev/rawctl c 162 0
```

Under no circumstances should you remove the file created by your Linux distribution for *rawio* control. The raw command will no longer work if you do.

For each disk device that you want to use as a local backup disk, you must create a raw device file for use by FDR/UPSTREAM. In order to do, you must first select the disks that you want to use for local backup. You will need to know the Linux device names that correspond to the SCSI devices you want to use. You can browse the output of the **dmesg** command for the messages generated at boot time by the *sd* driver listing the detected SCSI disks.

As can be seen in the following sample output from **dmesg**, the SYMMETRIX disk with an id or target of 0 and lun 0 will be SCSI disk sdh, the device file for this disk is /dev/sdh.

```
(scsi1:0:0:0) Synchronous at 40.0 Mbyte/sec, offset 8.
  Vendor: EMC       Model: SYMMETRIX         Rev: 5267
  Type:   Direct-Access                      ANSI SCSI revision: 02
Detected scsi disk sdh at scsi1, channel 0, id 0, lun 0
(scsi1:0:1:0) Synchronous at 40.0 Mbyte/sec, offset 8.
  Vendor: EMC       Model: SYMMETRIX         Rev: 5267
  Type:   Direct-Access                      ANSI SCSI revision: 02
Detected scsi disk sdi at scsi1, channel 0, id 1, lun 0
(scsi1:0:2:0) Synchronous at 40.0 Mbyte/sec, offset 8.
  Vendor: EMC       Model: SYMMETRIX         Rev: 5267
  Type:   Direct-Access                      ANSI SCSI revision: 02
Detected scsi disk sdj at scsi1, channel 0, id 2, lun 0
```

If you make any changes to your SCSI configuration, it is very likely that the Linux device names shown above will change. The above output is from a system that contains a single channel ultra2 SCSI controller and a dual channel differential controller. The devices shown above are connected to the first channel of the differential controller. The ultra2 controller is the first SCSI controller seen by Linux and has seven SCSI disks connected to it. These disks are assigned to device files sda-sdg. The SYMMETRIX disks are then assigned to device files starting with sdh. If a disk were added to the first SCSI controller, the names of each SYMMETRIX disk will change and would now start at sdi. Similarly, if a disk were removed from the first SCSI controller, the names of the SYMMETRIX disks would now start at sdg. When any changes are made to your SCSI configuration, you must check the output from the **dmesg** command. If the device names of the local backup disks have changed, you will have to perform the following setup again.

Assuming you want to use the SYMMETRIX disk with id 1 and lun 0 as your local backup device which in Linux is /dev/sdi, you must create a raw device file for FDR/UPSTREAM and use the raw command whenever the system is booted to bind the *sd* device file to the raw device file. FDR/UPSTREAM will only use raw device files named:

```
/dev/rsdxx
```

Where sdxx corresponds to the Linux device name. The raw device files are created with the **mknod** command. These files must have a major number of 162. The minor number can be between 1 and 255 and must be unique for each file. If you are running other software that is using *rawio*, you must use minor numbers for the FDR/UPSTREAM raw device files that are different than the ones already in use. For example, the setup documentation for Oracle Parallel Server for Linux suggests creating a raw device for the Node Monitor named /dev/raw/nodemtr with a minor number of 1. In this case you should not use a minor number of 1 for any of the FDR/UPSTREAM raw device files. Assuming that no other raw devices are being used, to create the raw device file for /dev/sdi enter:

```
# mknod /dev/rsdi -c 162 1
```

The *-c* option in mknod creates a character device. If you want to create a raw device file for a second local backup disk on /dev/sdj enter:

```
# mknod /dev/rsdj –c 162 2
```

In order to use these raw device files, they must be bound to the appropriate sd device with the raw command every time the system is booted. You might want to put these commands in the local system startup script for your distribution. The name of this file tends to vary from distribution to distribution. Some typical names for this file are */etc/rc.d/rc.local* and */etc/rc.d/boot.local*. To bind these raw device files enter:

```
# raw /dev/rsdi /dev/sdi
# raw /dev/rdsj /dev/sdj
```

The output from the above commands will show the major and minor number of the block device that the raw device was bound to. In addition, the name of the raw device shown in this output will not be the name used with the raw command. It will be of the form */dev/raw/rawn* where n will be the minor number used when creating the raw device file. The base part of the name may be different depending on the distribution.

Windows 2000 COM+ Class Registration Database (v3.1.4a)

UPSTREAM now has the capability of backing up and restoring the Windows 2000 COM+ Class registration database. In Windows NT/95/98/ME, the COM Class registration information is kept in the registry and is thus backed up with the registry.

COM+ is new for Windows 2000 and its Class registration information is kept in a separate database. Ironically, the original need for the registry was to handle the COM Class registration information, but the registry's use was expanded to handle all types of hardware and software configuration information as well. Now Microsoft has removed the COM+ Class registration information from the registry.

Note that the COM+ database is included as part of the System State PlugIn backup (see above). We recommend that you use the System State PlugIn as part of your regular backup procedures.

The COM+ Class Registration Database File

The COM+ Class registration database is stored on disk in files maintained in the %SystemRoot%\Registration directory. These files have the following extensions:

- ·.clb
- ·.crmlog

These files are not directly backed up by UPSTREAM since they are referenced in the **ComPlus** value of the **\HKLM\SYSTEM\CurrentControlSet\Control\BackupRestore\FilesNotToBackup** key of the registry. UPSTREAM instead deals with the entire COM+ Class registration database as a single internally generated file named **%SystemRoot\system32\config\COM+**. UPSTREAM handles this COM+ file just like one more registry hive file and will back it up and restore it along with the other registry hive files. Refer to the section of the manual that deals with backing up the registry for how to enable this option. So long as the registry option is enabled, and the COM+ database is part of your file spec, it will be included in the backup or restore.

Of course, the COM+ file is not a real file. It does not exist on the disk before or after a backup or restore. This file is created as needed by UPSTREAM during a backup using the RegDBBackup function and restores it using the RegDBRestore function. After the file is backed up or restored, temporary files are deleted.

Windows 2000 Certificate Server (v3.1.4a)

Overview

UPSTREAM now has the capability of backing up and restoring a Windows 2000 Certificate Server database. This capability is made possible through the use of a FDR/UPSTREAM feature called PlugIns and a PlugIn module named CertServ.dll. The CertServ PlugIn (CertServ.dll) uses the Certificate Server (CertSrv) Backup API to perform online backups and offline restores of the Certificate Server. This document describes the specifics of the CertServ.dll PlugIn module. Refer to the *FDR/UPSTREAM PlugIns* section for more information about how UPSTREAM interacts with PlugIn modules. This document assumes that you are familiar with the Certificate Server, its terminology and how to manage it.

Note that the Certificate Server database is included as part of the System State PlugIn backup (see above). We recommend that you use the System State PlugIn as part of your regular backup procedures, rather than backing up individual components with PlugIns such as CertServ.

CertServ PlugIn Backups

The CertServ PlugIn can be used with UPSTREAM on any Windows 2000 operating system machine on which the following DLL files exist:

- CertServ.dll
- NTDSBMSG.dll
- NTDSAPI.dll
- NETAPI32.dll

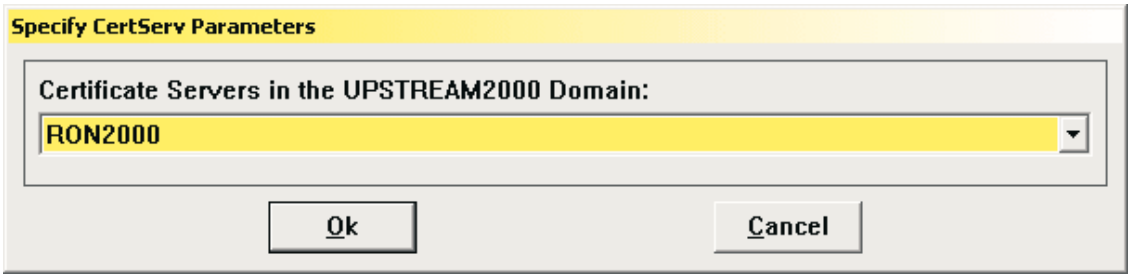
UPSTREAM running on this machine can use the CertServ PlugIn to backup any number of Certificate Server servers as long as they reside in the same domain as the machine on which UPSTREAM is run.

All CertServ PlugIn backups are full backups, even if you select Incremental merge as your backup type. The CertSrv Backup API does not support incremental backups. Since a single Certificate Server may become quite large, you may decide to include the CertServ file specifications for your First-time full and Full merge backups only.

From UPSTREAM on your Windows 2000 PC, to specify the use of the CertServ PlugIn to back up a single Certificate Server, use the Backup Parameters dialog to add a new file specification (or select a file specification that you want to alter) and then press the **PlugIn…** button. The file spec is not used by the PlugIn. The *PlugIn for File Specification…* dialog is then displayed.

CertServ has a unique PlugIn ID number of 6 and a descriptive name of **Windows Certificate Server**. The PlugIn ID number is used internally by UPSTREAM to uniquely identify PlugIn modules. The descriptive name is used on the *PlugIn for File Specification …* dialog to select this PlugIn for use with a particular file spec.

If you press **PlugIn Parameters...** the dialog specific to Certificate Server is displayed:



The only option is a pull down to select the fully qualified DNS style name of the certificate server you wish to back up. In the above example, RON2000 is the name of a certificate server and UPSTREAM2000.com is the name of the domain in which it resides.

CertServ uses the CertSrv Backup API to get the names of the individual Certificate Server files to be backed up and then packages these files together in a single virtual file named *\\servername\CertServ\CertServ.bin*. For example, \\RON2000.UPSTREAM2000.com\CertServ\CertServ.bin. CertServ makes this virtual file appear as a real file to UPSTREAM, which then backs it up in the normal manner.

CertServ requires a specific set of file specification parameters that it sets automatically. As a result, the *Backup Parameters* dialog does not allow you to modify the Backup Specification field or press the *Spec Detail...* button to alter the rest of the file specification parameters.

The CertServ PlugIn may be used for multiple file specifications as long as the Certificate Server (DNS style) names are unique for each file specification. The CertServ PlugIn may also be used in conjunction with other file specifications that do not use PlugIns or use other PlugIns as long as the other PlugIns also allow this combination.

To backup a Certificate Server, the Certificate Services service must be started. The backup is then an on-line backup.

CertServ PlugIn Restores

To start a restore from the server to be restored, in UPSTREAM pull down the **Action** menu and select the **List and Restore**. If the latest backup version of the current backup profile had multiple file specifications and one or more of these file specifications did not use the CertServ PlugIn, the *Inquire/Restore PlugIn Selection for Profile...* dialog will be displayed.

From this dialog, select the **Windows Certificate Server** item and press the **Continue…** button. When the Continue… button is pressed or if the backup version contains file specifications that all use the CertServ PlugIn, the *Inquire/Restore for Profile...* dialog is displayed.

On this dialog you will see all of the top-level file specifications included in this backup version. If you attempt to expand a file specification that does not use the CertServ PlugIn, the list of files for that file specification will not be displayed. Find the file specification for the Windows Certificate Server to be restored and highlight the **CertServ.bin** file for that file specification and press the **Select for Restore** button.

This will enable the **PlugIn…** button (the **More…** button will not be enabled since the CertServ PlugIn requires complete control of the file specification parameters). Press the **PlugIn…** button to display the *PlugIn for File Specification ...* dialog. Press the **PlugIn Parameters...** button to display the *Specify CertServ Parameters* dialog (the same one described above for backups).

The server name drop down list will contain the names of all of the DNS style names of the Certificate Server servers in your local domain.

Once you have set the CertServ PlugIn parameters to your liking, press the **Ok** button to return to the *PlugIn for File Specification ...* dialog. You will now see the **Parameters** field filled in with a set of parameters in the format *SERVER=servername*. For example:

```
SERVER=RON2000
```

You can then proceed to start the restore.

To restore a Certificate Server, the Certificate Services service must be started. The CertServ PlugIn will stop the Certificate Services service after the restore is started. The Certificate Services service will remain stopped after the restore has finished.

Host Initiating CertServ Backups and Restores

Like all other UPSTREAM backups and restores, those that use the CertServ PlugIn may also be initiated from the host via a USTBATCH job. The parameters for such a backup or restore are the same as any other backup or restore with the addition of the following parameters in the file specification section (i.e. after the SPECNUMBER:

FILES \\servername\CertServ\CertServ.bin
PLUGIN CertServ.dll
PLUGINPARAMETERS SERVER=servername

Each PlugIn module has a specific set of PlugIn specific parameters (specified with the PLUGINPARAMETERS UPSTREAM parameter). The format for the PlugIn parameters for CertServ is:

```
SERVER=servername
```

Where:

- **SERVER=servername** The name of a Certificate Server.

Note that the file spec is not verified as it will be internally generated but must be specified.

Windows 2000 Cluster Server Quorum Database (v3.1.4a)

Overview

UPSTREAM now has the capability of backing up and restoring a Windows 2000 Cluster Server quorum database. This capability is made possible through the use of a FDR/UPSTREAM feature called PlugIns and a PlugIn module named Cluster.dll. The Cluster PlugIn (Cluster.dll) uses the Cluster Server (CLUSAPI.DLL) Backup API to perform online backups and offline restores of the Cluster Server quorum database. This document describes the specifics of the Cluster.dll PlugIn module. Refer to the *FDR/UPSTREAM PlugIns* section for more information about how UPSTREAM interacts with PlugIn modules. This document assumes that you are familiar with the Cluster Server quorum database, its terminology and how to manage it.

Note that the Certificate Server database is included as part of the System State PlugIn backup (see above). We recommend that you use the System State PlugIn as part of your regular backup procedures, rather than backing up individual components with PlugIns such as Cluster.

Cluster PlugIn Backups

The Cluster PlugIn can be used with UPSTREAM on any Windows 2000 operating system machine on which the following DLL files exist:

- CLUSAPI.DLL
- NETAPI32.dll
- MPR.dll

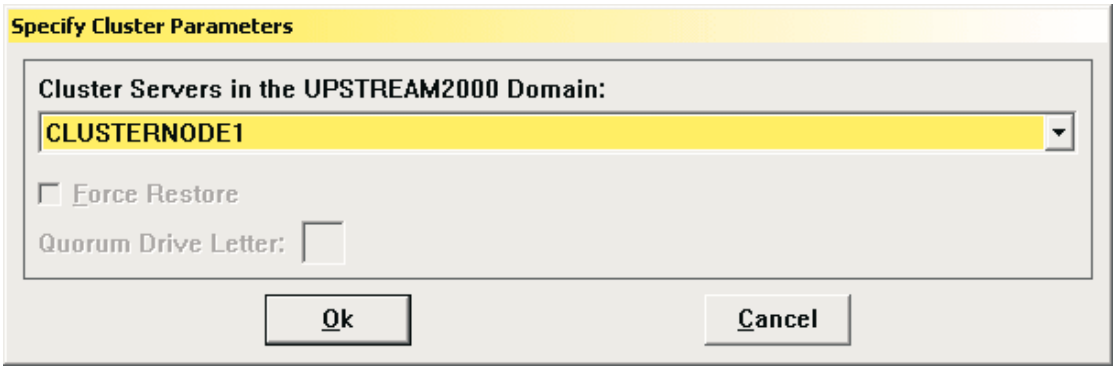
UPSTREAM running on this machine can use the Cluster PlugIn to backup any number of Cluster Server servers as long as they reside in the same domain as the machine on which UPSTREAM is run.

All Cluster PlugIn backups are full backups, even if you select Incremental merge as your backup type. The Cluster Backup API does not support incremental backups. Since a single Cluster Server may become quite large, you may decide to include the Cluster file specifications for your First-time full and Full merge backups only.

From UPSTREAM on your Windows 2000 PC, to specify the use of the Cluster PlugIn to back up a single Windows Cluster server, use the Backup Parameters dialog to add a new file specification (or select a file specification that you want to alter) and then press the **PlugIn…** button. The file spec is not used by the PlugIn. The *PlugIn for File Specification…* dialog is then displayed.

Cluster has a unique PlugIn ID number of 7 and a descriptive name of **Windows Cluster Server**. The PlugIn ID number is used internally by UPSTREAM to uniquely identify PlugIn modules. The descriptive name is used on the *PlugIn for File Specification …* dialog to select this PlugIn for use with a particular file spec.

If you press **PlugIn Parameters...** the dialog specific to Cluster Server is displayed:



For backup, the only parameter is the name of the cluster server you wish to backup. Select the one you wish to use from the pull-down.

Cluster uses the Cluster Server (ClusAPI) Backup API to backup the cluster database files to a temporary directory on disk and then packages these files together in a single virtual file named \\servername\Cluster\Cluster.bin (ex: \\CLUSTERNODE1\Cluster\Cluster.bin). Cluster makes this virtual file appear as a real file to UPSTREAM, which then backs it up in the normal manner.

The actual Cluster Server quorum database is maintained on a special disk drive that is managed solely by the Cluster Server. This is typically the Q: drive of a clustered system. This quorum database drive should not be included in your normal backups since the files on this drive are managed by the Cluster Server and cannot be restored normally.

Cluster requires a specific set of file specification parameters that it sets automatically. As a result, the *Backup Parameters* dialog does not allow you to modify the Backup Specification field or press the *Spec Detail...* button to alter the rest of the file specification parameters.

The Cluster PlugIn may be used for multiple file specifications as long as the Cluster Server names are unique for each file specification. The Cluster PlugIn may also be used in conjunction with other file specifications that do not use PlugIns or use other PlugIns as long as the other PlugIns also allow this combination.

Cluster PlugIn Restores

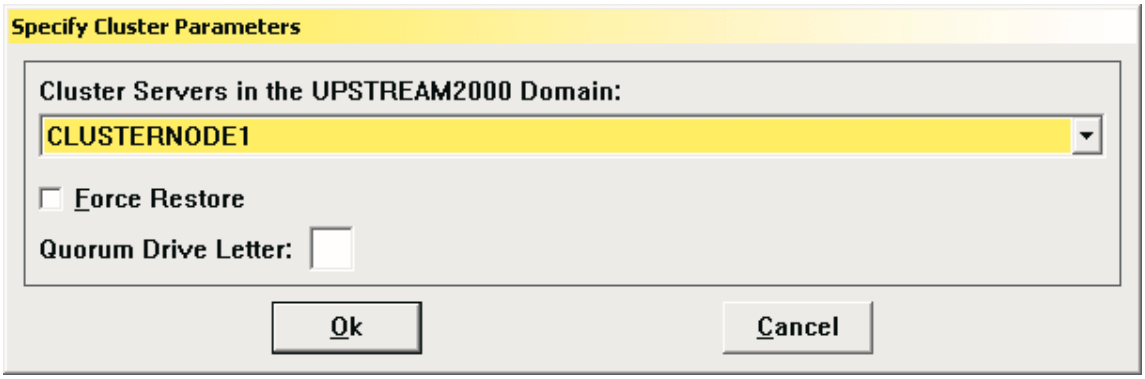
To start a restore from the server to be restored, in UPSTREAM pull down the **Action** menu and select the **List and Restore**. If the latest backup version of the current backup profile had multiple file specifications and one or more of these file specifications did not use the Cluster PlugIn, the *Inquire/Restore PlugIn Selection for Profile...* dialog will be displayed.

From this dialog, select the **Windows Cluster Server** item and press the **Continue…** button. When the Continue… button is pressed or if the backup version contains file specifications that all use the Cluster PlugIn, the *Inquire/Restore for Profile...* dialog is displayed.

On this dialog you will see all of the top-level file specifications included in this backup version. If you attempt to expand a file specification that does not use the Cluster PlugIn, the list of files for that file specification will not be displayed. Find the file specification for the Windows Certificate Server to be restored and highlight the **Cluster.bin** file for that file specification and press the **Select for Restore** button.

This will enable the **PlugIn…** button (the **More…** button will not be enabled since the Cluster PlugIn requires complete control of the file specification parameters). Press the **PlugIn…** button to display the *PlugIn for File*

Specification ... dialog. Press the **PlugIn Parameters...** button to display the *Specify Cluster Parameters* dialog.



The server name drop down list will contain the names of all of the machines in the local domain. The current server name will be the name of the server from which the Cluster Server quorum database was backed up, taken from the file spec for the backup. The remaining parameters are discussed below in the *Special Rules for Restores* section.

Once you have set the CertServ PlugIn parameters to your liking, press the **Ok** button to return to the *PlugIn for File Specification ...* dialog. You will now see the **Parameters** field filled in with a set of parameters. For example:

```
SERVER=CLUSTERNODE1 FORCE=N QUORUMDRIVELETTER=
```

Special Rules for Restores

While backups of a Cluster Server node can be performed from any other Windows 2000 system in the domain, restores to a Cluster Server node must be performed on the Cluster Server node. Remote restores are not possible.

To perform a restore to a Cluster Server node, only the node that is being restored to can be running the Cluster service. All of the other cluster nodes in the cluster must be stopped (i.e. not running the Cluster service). For this reason, you must manually shut down the Cluster service on all the other nodes. The exception to this rule is when you specify FORCE=Y sub parameter of the PLUGINPARAMETERS for the restore. In this case, the restore process will shut all of the other nodes in the cluster down.

Another requirement for a successful restore is that the quorum disk (Q: by default) must have the same partition layout (number of partitions and offsets to each partition) as the quorum disk described in the backup. If this is not the case, you must manually reconfigure the quorum disk to match the layout described in the backup. Again, the exception to this rule is when you specify FORCE=Y sub parameter of the PLUGINPARAMETERS for the restore. In this case, the restore process will attempt to reconfigure the quorum disk to match the disk described in the backup.

In the case where the quorum database is now on a drive other than the default Q: drive, specify the QUORUMDRIVELETTER=?: sub parameter of the PLUGINPARAMETERS for the restore. Use the form "?:", where ? is the drive letter of the quorum database drive.

In most cases you will not need to specify FORCE=Y or QUORUMDRIVELETTER=?: if you start the restore by manually stopping all of the cluster nodes for the cluster other than the node that you will be restoring to. Also, since the quorum database is shared between the various cluster nodes, it is not necessary to restore to all of the nodes of the cluster. Only one restore is required for an entire clustered system.

Host Initiating Cluster Backups and Restores

Like all other UPSTREAM backups and restores, those that use the Cluster PlugIn may also be initiated from the host via a USTBATCH job. The parameters for such a backup or restore are the same as any other backup or restore with the addition of the following parameters in the file specification section (i.e. after the SPECNUMBER parameter):

```
FILES \\servername\Cluster\Cluster.bin
PLUGIN Cluster.dll
PLUGINPARAMETERS SERVER=servername FORCE=yn QUORUMDRIVELETTER=drive
```

The correct format for the FILES parameter is not crucial since the Cluster PlugIn will override it anyway and force it to be \\servername\Cluster\Cluster.bin. It does this by getting the real server name from the PLUGINPARAMETERS value.

The format for PLUGINPARAMETERS is:

```
SERVER=servername FORCE=yn QUORUMDRIVELETTER=drive
```

Where:

- **SERVER=servername** The name of a Cluster Server to be backed up or restored.
- **FORCE=yn** An optional parameter used only for restore. The value must be either 'Y' or 'N'. When set to 'Y', a restore is forced. This is discussed in detail in the *Special Rules for Restores* section above.
- **QUORUMDRIVELETTER=drive** An optional parameter used only for restore. The value must be blank or in the form "?:", where ? is 'a' – 'z' or 'A' – 'Z'.

Multi-Processing UPSTREAM (v3.1.4a)

UPSTREAM is now automatically capable of supporting multiple simultaneous executing instances of UPSTREAM in the same directory in UNIX and Windows. Workpath, restarts and a number of other issues are automatically handled.

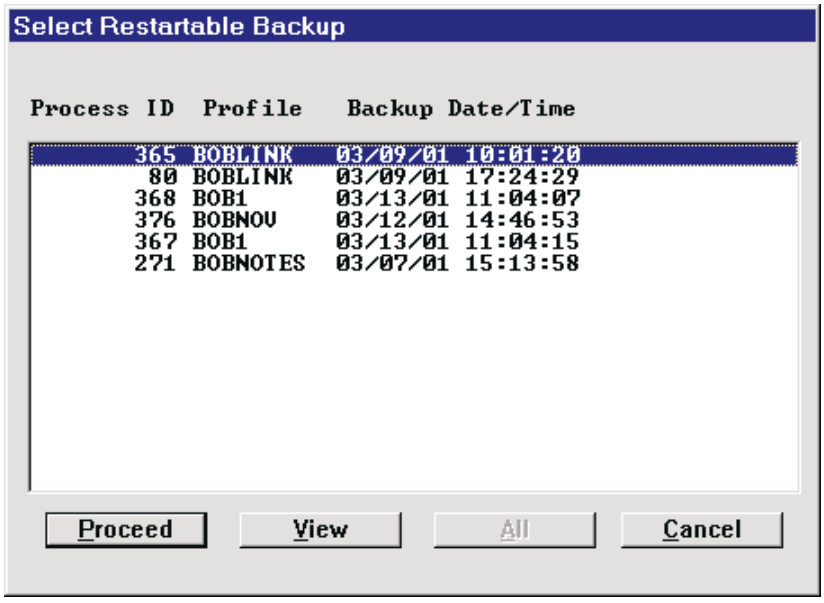
The existing multi-user facilities for Windows and OS/2 are still supported - and recommended particularly for handling multiple incoming requests from the host or the UPSTREAM Director. The multi-processing feature is intended to allow multiple copies of UPSTREAM to be run without having to worry about conflicting temporary files in the WORKPATH. However, all other multi-processing considerations discussed in the *Running More Than One Copy* chapter of the UPSTREAM manual still apply, communications in particular. In version 3.1.4e, multi-processed remote initiates use this technique and the existing multi-user facility is now deprecated.

No configuration or other changes are required to take advantage of this facility - it is the new operating mode for UPSTREAM. Note that this facility is only for UNIX and Windows - it is not available for Novell (NLM) or OS/2.

You can use this facility to share a copy of UPSTREAM on a network drive. The only note would be that if two instances of UPSTREAM running on different machines happen by chance to have the same process ID, the second instance would report a fatal error and not start. Simply restarting the second instance should resolve the problem. This is not recommended for unattended operations.

There are quite a number of minor differences in the way that UPSTREAM handles it's internal files. The main difference that a user would note relate to restart.

Previously, only the most recent restartable backup or restore was eligible for restart. Now, any failed restartable backup or restore can be restarted. From UPSTREAM, when you pull down the **Action** menu and select one of the restart options (**Restart Backup**, **Restart Restore**, **Kill Restartable Backup** or **Kill Restartable Restore**), you will see a new restart selection dialog:



The list displays the process ID, backup profile and formatted version date of the request.

The buttons are:

- **Proceed:** The highlighted backup or restore will be restarted or killed (based on the menu item you selected previously).
- **View:** Displays the UPSTREAM file viewer and allows you to see the parameters specified for the original request.
- **All:** Enabled only when you specified one of the Kill menu options, allows you to kill all of the pending restartable backups or restores.
- **Cancel**: Returns you to the main UPSTREAM screen.

Restartable backups or restores are preserved until they are not restartable or they are more than 7 days old. You can change the default aging time with the environment variable **USBACKFILEDAYSOLD**.

Any host initiated or unattended restart or kill restart request will process the most recent backup or restore by default. If you wish to specify a specific one use the non-repeating parameter RESTARTVERSIONDATE and specify the backup version date in 12-digit YYMMDDHHMMSS form.

Some of the minor differences relating to multi-processing are:

- All instances of UPSTREAM write to the common UPSTREAM log.
- UPSTREAM local reports continue to use the specified report file name (defaulting to *us.rpt*). When UPSTREAM is processing the backup or restore, the report is written to a temporary name (us.<pid>.rpt) and copied to the specified report name when the process has completed.
- Temporary files have the process ID in the name.
- us.ret does not have a name change.

Notes R5 Enhancements (v3.1.4a)

FDR/UPSTREAM has a number of improvements targeted specifically for Lotus Notes R5. These include:

- Multiple simultaneous backups running in parallel.
- Detection of new databases during incrementals.
- Support for all active logs.

Multiple Backups

The NotesR5 agent now supports multiple simultaneous backups. To do this you must:

- Logically separate the backups. You must create multiple, non-overlapping, UPSTREAM backups requests to separate backup profiles. If your data is stored on multiple drives or separate directories, this can be quite simple (one backup of the Notes data directory on the C: drive; another backup of the Notes data directory on the D: drive for example). Otherwise separate them by extension (*.NSF in one backup, *.NTF in another, *.BOX in yet another for example).
- Specify the log files in only one of these backups.

If you are performing a restore in which you wish to apply transaction logs there is no problem if the database is being restored from the backup profile used to store transaction logs. However, if you used a different backup profile for the transaction logs, you must specify the new PLUGINPARAMETERS value, **LOGBACKUPPROFILE** with the backup profile used for the transaction logs. Then if a transaction log is needed, it will be recovered correctly.

Incremental Detection of New Databases

There is a new PLUGINPARAMETERS value **DBCHANGEDCHECK**. Set to 'Y' if you wish to have UPSTREAM call Notes to determine if a given database is new and requires a full backup - it is more reliable than the archive bit or modification date.

This option is particularly useful for incrementals so that new databases are fully backed up and databases which do not need it are not. To best use it with incrementals, use the LOGFILES=Y option instead of LOGFILES=O and specify the databases you wish to include (with wildcards) in the same manner as you do for the full. It does not detect if a DBIID has changed, so databases with changed DBIIDs should be backed up manually or you should perform full backups immediately after system maintenance which cause DBIIDs to change (such as compaction).

If a database is new it may report UPSTREAM error #10143 and Notes error #5114 and the database will be fully backed up. It is not terribly useful for full merge backups as UPSTREAM will still use the last modification date to indicate if the file has changed, will most likely consider this to be a mismatched file and back it up fully. The default is 'Y'.

Active Transaction Logs

To assure that databases are completely recoverable, all active log files are now included in log file backups along with the most recent one. No changes are required, but you should expect your log file backups to be quite a bit bigger, particularly if you have specified a large transaction log size (as specified in the Domino Administrator). To reduce the size of your daily backups, you may want to consider reducing the size of your transaction logs.

Novell SMS Open File Support (v3.1.4a)

FDR/UPSTREAM, through it's use of Novell's SMS for file access, is capable of backing up open and active files on NetWare v5.1 NSS volumes.

To enable the facility, the procedure is:

☐ 1. Load the updated NSS modules on the NetWare 5.1 server, supplied in support pack 2 or later. Make sure to include the TSA as well.

☐ 2. From the server System Console, enter:

```
NSS /FileCopyOnWrite = <NSS_Volume_Name>
```

Repeat this step for each NSS volume.

☐ 3. Verify that Copy on Write is enabled for the target NSS volumes. From the server System Console enter:

```
NSS VOLUMES
```

Copy on Write should be displayed in the Attributes column.

The "Directory Quotas" and "File Copy On Write" features for NSS volumes are mutually exclusive. In other words, you may have one or the other of these features activated at one time but not both.

Minor Changes

Some of the minor changes in this release include:

- (v3.1.4e) (Windows) Windows complete system backups. You can now backup all files on all read/write volumes on a given Windows system (including the Windows 2000 System State), with a single file spec: \\<machine name>. This dramatically simplifies backup specification. When you specify this, UPSTREAM will automatically generate file specs for all read-write drives on your system and an additional file spec for the Windows 2000 System State and user quotas (if this is a Windows 2000 system). Do not use wildcards in the backup spec. You can use the '.' (dot) to indicate the local machine (i.e. \\.). When you do restores, you will see all of your drives (C:, D:, etc.) as well as the system state. For example, to backup all the files on the machine RON1 specify the file spec:

  ```
  \\RON1
  ```

  On a Windows 2000 cluster you can target either a node or a virtual server using this technique. For a complete system backup you should target all nodes and the virtual server.

- (v3.1.5 Windows) You can tune high compression with the environment variable **USCOMPRESSCODETABLETOSS**. It specifies how often UPSTREAM will reinitialize the high compression code table. By default UPSTREAM will reinitialize the table when the compression ratio begins to degrade; set this variable to a byte value (up to 4294967295). We recommend starting with a relatively high value (10000000) and working downwards. Do not bother with values less than 4096.

- (v3.1.4e) (MS SQL Server) The MSSQL PlugIn now supports installations on Microsoft cluster servers. There is a new PlugIn parameter CLUSTER=<cluster name> which detects the active cluster node for backups and restores and correctly names the data stored on the host.

- (v3.1.4e) (MS SQL Server) The MSSQL PlugIn now supports multiple installed instances of SQL Server on a Windows 2000 server. To specify an individual instance, setup an alias using the Client Network Utility, Alias tab. The alias name can be any name you choose, but the Server Name, must be in the format <server>\<instance>. Then in the UPSTREAM MSSQL PlugIn parameters, specify the alias name instead of the server name (all aliases defined on this client will be displayed in the list).

- (v3.1.4e) (Novell) NDS individual item restores can now use the trailing .T=<tree> as well as .[root].

- (v3.1.4e) A new environment variable has been defined, USRETRYWAIT, if set to 'Y', then CONV=WAIT or CONV=KEEP batch job requests, where the conversation failed or timed out, will be retried.

- (v3.1.4e) (AIX) The new enhanced JFS (JFS2) provided with AIX v5L is now supported. If you use earlier versions of UPSTREAM, files may be skipped without errors.

- (v3.1.4e) New environment variable USTCPSHUTDOWNWAIT which allows specification of a number of seconds to wait to allow TCP/IP to send all data.

- (v3.1.4d) (Win NT) You can now disable code pages for unicode translations by using the **USNOUNICODECODEPAGE** environment variable. If specified, UPSTREAM will not use a system code page for translation, but will use a simple one to two byte translation technique. Use this method if UPSTREAM can't properly manipulate or find files with either the ANSI or OEM code pages (defined using the USUNICODEPAGE environment variable).

- (v3.1.4d) (Win NT) Reports can now be written in unicode form. This causes all report items to be written in Unicode and is particularly useful for skipped file reporting of files with non-ANSI names. You'll need to use a Unicode capable viewer to view the reports with this option enabled (Notepad or Wordpad both handle Unicode). To enable this feature, check the Unicode checkbox in the reporting dialog or add 512 to REPORTOPTIONS. If you press the View button in the reporting dialog and have the Unicode option enabled, Notepad will be used instead of the UPSTREAM file viewer.

- (v3.1.4c) (Win 2000) The WinCrypt PlugIn is no longer required. Encrypted files are handled automatically by UPSTREAM. The PlugIn is still included on the CD but is not installed by default.

- (v3.1.4c) (NetWare 5) UPSTREAM can now be run in a directory with a long name.

- (v3.1.4a) UPSTREAM will now support file names up to 255 characters. For all operating systems except NLM, this is also the default. UPSTREAM will use the specified MAXFILENAMESIZE environment variable during the build backup phase. If UPSTREAM/MVS is not v3.1.4 or later, the size may be negotiated downwards after the backup has started and additional files will be skipped. If you are running the NLM version with SMS and have USSMSLONGNAMES enabled, files will be skipped if you are running a pre- UPSTREAM/MVS v3.1.4; thus the NLM version still defaults to 230.

- (v3.1.4a) (Director) Performance tests for remote UPSTREAMs can now be specified in the Director. There's a push button **Performance...** for raw communications tests are in the *Target Systems List*. There is a **Performance tests** button for the other tests in the *Backup Specifications* dialog.

- (v3.1.4a) (UPSTREAM/SOS) The local backup dialog now allows entry of a VOLSER as well as the disk location. There is a new button **List Only**, available in the local backup and the FDRSOS Local Backup Admin dialogs which when pressed will display only disk information for valid local backup disks. Since this new facility may cause spurious errors and hangs, you are warned before it begins building the list.

- (v3.1.4a) (Linux) UPSTREAM now supports the Reiser file system as well as ext2 and NFS.

- (v3.1.4a) (Win32) If UPSTREAM is run as a service, it will be immediately terminated if the service is stopped. Similarly, if the Attach Manager is run as a service, stopping the service will stop the Attach Manager and all UPSTREAMs that it started. This is particularly important for Clustered environments during manual failover so that the UPSTREAM service can be started cleanly on the new node.

- (v3.1.4a) A new option is available on the restore More... dialog: **Fail restore on single file error**. If checked a restore will be immediately failed if any file has any file open or write errors. Even if this option is not checked, UPSTREAM will fail a restore if it gets a file error for a restore of only one file (a single file spec with no wildcards). This is a repeating parameter **FAILRESTOREONERROR**, with a default of 'N'.

- (v3.1.4a) A new report option value, **Files Excluded (Restore only)**, if checked will report on files which were excluded because they are in the exclude list. This parameter is particularly valuable for Windows 2000, where the exclude list is automatically generated by the UPSTREAM Windows 2000 agent according to Windows 2000 restore guidelines. It uses the existing parameter REPORTOPTIONS, with a new bit value of 256. Excluded files are also written to the UPSTREAM log file. If you wish, you can disable this additional logging with the environment variable **USDONTLOGEXCLUDEDFILES**.

- (v3.1.4a) The UPSTREAM log can now be automatically cleared after a backup completes. The overall parameter **MAXLOGDAYS** if non-zero, specifies the number of days worth of log information to preserve, similar to the uslogclr program.

- (v3.1.4a) UPSTREAM backups can now be specified to disk and be sent to tape only if the backup exceeds a certain size. The size of the backup is after the DASDOVERRIDE has been applied. The overall parameter is

SWITCHTOTAPEMB and the size is specified in megabytes (1,048,576 bytes). Note: Be aware that UPSTREAM will use the tape dataset name rather than the disk data set name specified in the profile which may cause issues with GDGs.

- ☐ (v3.1.4a) (Windows and OS/2) The UPSTREAM logo displayed on the screen has changed to the new logo.

- ☐ (v3.1.4a) Interactive backups, restores, etc. will now run pre-, post- and fail- process jobs.

- ☐ (v3.1.4a) (Novell SMS) You can specify a separate report of truncated file names when file name truncation is enabled by specifying the environment variable USSMSLONGNAMES. The new environment variable **USSMSTRUNCATEREPORT** is used to both activate the report and specify its file name.

- ☐ (v3.1.4a) (Oracle Recovery Manager) See the v3.1.5 documentation or call tech support before using.

- ☐ (v3.1.4a) The Windows install has reorganized JRE installation messages.

- ☐ (v3.1.4a) (Windows) USLOGCLR is now a 32-bit Windows application.

- ☐ (v3.1.4a) (Windows) UPSTREAM will write UTF-8 file names to the reports if UTF-8 unicode encoding was specified.

- ☐ (v3.1.4a) There is a new registration field Attended, which indicates whether a copy of UPSTREAM registered in attended or unattended mode. Only unattended UPSTREAM instances are eligible for control by the UPSTREAM Director. To avoid registration conflicts, the default for the configuration DYNAMICPCINPORT is now N and we do not recommend users use dynamic inports without consideration.

- ☐ (v3.1.4a) (Windows) Registry files can now be backed up if you are using a share mapped below the root.

- ☐ **NOTE:** UPSTREAM does not support IP addresses as machine names either directly (as a UNC) or as a shared drive.

- ☐ **NOTE:** Make sure that utilities **usorback**, **usormgr** and **usorrest** are owned by the Oracle database owner and have the *set-user-ID* and *set-group-ID* bits set. To set those bits on, enter:

```
chmod 6751 usorback
```

NOTE: Windows 2000 users should apply Service Pack 2 to Windows 2000 systems from which Active Directory backups and restores are performed. Refer to Microsoft KnowledgeBase article Q295932.

Technical Specifications

- Previous version:

  FDR/UPSTREAM PC version 3.1.5 is a production release updating production version v3.1.4c and development versions 3.1.4d and 3.1.4e.

- Operating systems affected by this upgrade:

  All

- FDR/UPSTREAM MVS release prerequisites:

  3.1.4 is recommended but all prior releases of FDR/UPSTREAM MVS will operate. You must have v3.1.4 for 255 byte file name support.

- Problem resolutions:

  - (v3.1.5) (NLM, OS/2) Restarted backups and restores can now be killed and no longer log a garbage version number. Fixes v3.1.4c and later.
  - (v3.1.4e) (NLM) Sort backup no longer causes CPU hog abends.
  - (v3.1.4e) Migration no longer requires a blank DESTINATION to delete the files.
  - (v3.1.4e) (Linux, Tru64, Intel Solaris) UPSTREAM will now work correctly for backups with more than 131,072 files.
  - (v3.1.4e) (Windows) Restore scheduled operations (including registry restores) now operate correctly for restarted restores.
  - (v3.1.4e) (Win2000) Errors backing up the COM+ database (1520,64) have been resolved.
  - (v3.1.4e) Spurious program crashes (SIGSEGV) has been fixed.
  - (v3.1.4d) (Win 2000) Spurious connection failures with the agent will no longer occur.
  - (v3.1.4d) (OS/2) Remote initiates over SNA work correctly.
  - (v3.1.4d) (Win 2000) UPSTREAM will no longer report an error loading module NtFrsApi.dll". The workaround has been to change the severity of UPSTREAM message #5801 from an 'E' to an 'I'. Fixes v3.1.4c.
  - (v3.1.4c) (Oracle) A problem in Media Management backups has been fixed. We recommend upgrading to the newest version of UPSTREAM and performing a full as soon as possible.
  - (v3.1.4c) UPSTREAM will no longer report error #1809 No valid files to backup for incrementals when no files were found but the search was successful.
  - (v3.1.4c) (Win 2000) UNC names now work correctly in backing up the COM+ database (fixes v3.1.4b).
  - (v3.1.4c) (NLM) Multiple copies of UPSTREAM run correctly (fixes v3.1.4b).
  - (v3.1.4a) (Novell Auto-Recall) Expired stubs are selected for deletion correctly if you are using a non-SMS Novell Profile.
  - (v3.1.4a) (Novell Auto-Recall) Stubs can be backed up without recalling the files on NetWare v5.1.

- (v3.1.4a) (SQL Server) UPSTREAM will tolerate SQL Server indicating end of data on a restore, without failing the restore.
- (v3.1.4a) Backups that are canceled now appear to the host as having failed for a communications error. This allows the host to restart them using the RESTART batch parameter.
- (v3.1.4a) (UNIX) Daylight savings time is correctly accounted for in determining incremental changed files.
- (v3.1.4a) On restore excludes, the destination is now correctly checked rather than the original spec.
- (v3.1.4a) (Unix) The file system type for exclude specs are no longer tested; "APPC RECEIVE FOR BACKUP_DESC_REP FAILED" messages will no longer occur.
- (v3.1.4a) (Win32) Quoted command line parameters with embedded spaces are now handled correctly.
- (v3.1.4a) (MSSQL, MSESE, WINAD) A second restore using one of these PlugIns will no longer restore from the information obtained during the first restore.
- (v3.1.4a) (Director and End-User Restores) Dates in 2001 are displayed correctly.
- (v3.1.4a) (Director) Passwords are transmitted to the host correctly.
- (v3.1.4a) Passwords with special characters are transmitted to UPSTREAM/MVS correctly.
- (v3.1.4a) Jobs are run with the correct security when you require a local login.
- (v3.1.4a) (Windows 2000) UPSTREAM will no longer abend if you attempt to back up files on a drive which does not have a system protected file on it. Contact Innovation for instructions on working around the problem with v3.1.4.
- (v3.1.4a) (Windows) UPSTREAM will no longer errantly report error #1268 when terminating in service mode.
- (v3.1.4a) (Novell Auto-Recall) The notifier can connect over any connection type (SPX or TCP) regardless of the connection type used by the NetWare Client. The recaller also takes less stack space and will no longer report errant C error #16 errors opening the return code file after a recall.
- (v3.1.4a) Hard links are restored correctly if a file date is existent in the default parameter file.

☐ Who should upgrade:

Users who need one of the problem resolutions or enhancements. Windows 2000 users should upgrade and verify that all components of the system state are included in their backups.

☐ New configuration parameters:

None.

☐ New overall parameters:

Name	Default	Required	Description
MAXLOGDAYS	0	No	If non-zero, clears out old log file entries after a backup. Specifies the number of days worth of log information to preserve.

REPORTOPTIONS (New value)	0	No	256: Files excluded during a restore are reported. 512: All reporting is written in unicode.
RESTARTVERSIONDATE	None	No	If you specify a restartable action type, the version date of the backup or restore which is being restarted. If the field is left blank, the most recent backup/restore is restarted.
SWITCHTOTAPEMB	0	No	If non-zero, disk backups will be sent to tape if the calculated size of the backup (after DASDOVERRIDE is applied) is greater than or equal to this value. Specify in megabytes (1,048,576 bytes).

- New file spec parameters:

Name	Default	Required	Description
AUTHORITATIVERESTORE (Win 2000)	N	No	'Y': Restore replicated directories authoritatively. 'N': Restore replicated directories non-authoritatively. Requires a reboot.
FAILRESTOREONERROR	N	No	'Y': The entire restore will be failed if there is a file open or write error to any file in this spec. 'N': File errors are logged and the restore continues.
WRITESPARSE	8192	No	The boundary number of bytes that a sparse file will be written.

- New environment variables:

Name	Default	Description
USBACKFILEDAYSOLD (Windows and UNIX)	7	Specifies the retention period in days for restartable backup and restore files.
USCOMPRESSCODETABLETOSS (Windows)	Not defined	How often UPSTREAM will reinitialize the high compression code table. By default UPSTREAM will reinitialize the table when the compression ratio begins to degrade; set this variable to a byte value (up to 4294967295). We recommend starting with a relatively high value (10000000) and working downwards. Do not bother with values less than 4096.
USDONTLOGEXCLUDEDFILES	Not defined	UPSTREAM will log the names of files that are excluded from a restore. Setting this environment variable to any value will cause UPSTREAM to not log these messages.

Name	Default	Description
USNOTATTMGR	Not defined	If defined, the listening UPSTREAM will process all inbound requests without starting a new process.
USNOUIDGIDERRORS	Not defined	(UNIX only) If set to any value, 8000 and 8001 errors will not be displayed for missing UID and GID names.
USNOUNICODECODEPAGE (Windows and UNIX)	Not defined	If specified, UPSTREAM will not use a system code page for translation, but will use a simple one to two byte translation technique. Use this method if UPSTREAM can't properly manipulate files with either the ANSI or OEM code pages (defined using the USUNICODEPAGE environment variable).
USREPORTWAIT	1	Number of minutes to continue retrying appending a temporary report file to the base report file.
USRESTOREPACING	Not defined	The number of hundredths of a second delay between mainframe sends for restores. Used when timing is suspected for communications failure or data corruption.
USRETRYWAIT	Not defined	If set to 'Y', then CONV=WAIT or CONV=KEEP batch job requests, where the conversation failed or timed out will be retried.
USSMSTRUNCATEREPORT (Novell SMS)	Not defined	Enables and specifies the file name of a report of truncated file names.
USTCPSHUTDOWNWAIT	Not defined	Allows specification of a number of seconds to wait for TCP to send all data before the socket is closed.